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Do children adopted from British Foster Care show difficulties in executive functioning and social communication?

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Volume I

**SYSTEMATIC LITERATURE REVIEW,
MAIN RESEARCH PROJECT
AND
SERVICE EVALUATION PROJECT**

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Doctorate in Clinical Psychology

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Systematic literature review

THE IMPACT OF LIVING OUTSIDE OF
THE BIOLOGICAL FAMILY HOME ON
EXECUTIVE FUNCTIONING
DEVELOPMENT

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Abstract

Background

Early life stress and maltreatment has been observed to impact on cognitive development. Executive functioning (EF) processes begin to develop from early infancy and there is emerging evidence that early life maltreatment might influence their development. Children who have been removed from the family home and are in care or adopted are particularly likely to have experienced maltreatment and early life disruption.

Objectives

This systematic review aimed to extract and synthesis data relating to whether looked after (LAC), adopted and post-institutionalised (PI) children show deficits on tests of EF. A secondary aim was to compare across these sub-groups and identify similarities or differences in EF abilities.

Methods

A systematic search of three electronic databases was completed: Ovid, Web of Knowledge and the Cochrane library. Of the 895 records that were screened, 30 studies were identified to meet the selection criteria and included in this review.

Results

The majority of studies examined EF in PI children (n = 24). In this population parental reported EF difficulties were consistently observed and associated with duration of institutionalisation. Poorer performance was also observed on several laboratory tasks of EF. LAC and adopted studies eluded to potential EF problems, however comparisons were difficult due to the limited number of studies and range of tasks used. Comparisons across populations were not possible due to the use of differing tasks and small number of identified studies.

Conclusion

This review provides evidence for the impact of environmental and social factors on EF development. It suggests that PI children may be more likely to exhibit EF

difficulties, particularly if they are removed from institutions at older ages. Furthermore the current evidence for LAC and adopted children, taken alongside the known impact of childhood maltreatment, suggests that these populations may be at higher risk for exhibiting EF difficulties.

1. Introduction

Executive functioning (EF) is an umbrella term which encompasses a wide range of cognitive processes that govern purposeful goal-directed behaviour and how we respond to novel situations (Hughes, 2011). The term EF is often used interchangeably with frontal lobe functioning due to the hypothesised importance of the frontal cortex in completing EF tasks (Elliot, 2003). EF processes include “*anticipation, goal selection, planning, initiation of activity, self-regulation, mental flexibility, deployment of attention, and utilization of feedback.*” (Anderson, 2002, p71). In addition to the aforementioned skills, the EFs have been implicated in playing a pertinent role in several aspects of a child’s social and academic development for example the development of pragmatic skills (Blain-Briere, Bouchard & Bigras, 2014), reading skills (Cartwright, 2012) and mathematical achievement (Bull, Espy, & Wiebe 2008).

Research from the last 25 years has indicated that the EF are a group of ‘*separable but related functions*’ (Miyake, Friedman, Emerson, Witzki, Howerter & Wager, 2000). These skills do not develop as one unitary process, but rather they appear to emerge at different stages from infancy to early adulthood following differing developmental trajectories (Best & Miller, 2010; Blakemore & Choudhury, 2006; Carlson, 2005; Cuevas & Bell, 2010; Dawson & Guare, 2010; Garon, Bryson, & Smith, 2008; Hoehl, Reid, Mooney & Striano, 2008; Hughes, 2011). For example, during early to middle childhood processes such as working memory and inhibition appear to develop earlier than cognitive flexibility (Davidson, Amso, Anderson, & Diamond, 2006). Anderson, Anderson, Northam, Jacobs & Catroppa (2001) suggested that the maturation of EF is rapid throughout early and middle childhood but that it slows considerably during late childhood and adolescence. They found that although improvements were seen across problem solving skills and planning abilities, the most significant EF development in late childhood and adolescence occurred in the domain of attentional control–processing speed, with older adolescents displaying greater attentional capacity and faster task completion. This is just a brief demonstration of the complexity in the development of this wide

ranging set of skills, for a comprehensive overview of EF development see Hughes et al (2011).

To ensure accurate goal completion, children and adults are required to implement a number of these diverse EF processes. Difficulties in the application of any of these processes can disrupt task performance and lead to a range of primary and secondary problems. Consider the example of a child preparing their bag for school; this seemingly simple task requires a number of processes that fall into the EF category. The child must be able to initiate the activity, plan what is needed for the following day, keep in mind the multiple required items, check whether they have missed anything and incorporate this information to pack any forgotten items. A disruption in any of these five processes could result in the child failing to complete the task of packing their bag correctly. Alongside day-to-day disruptions in goal-directed behaviour, children with EF deficits have been observed to display a range of difficulties in regulating both their emotions and behaviour (Anderson, 2002). Furthermore scholastically, a relationship has been observed between stronger EF abilities and improved academic performance and learning (Bull et al., 2008; Gathercole, Pickering, Knight, & Stegmann, 2004).

EF deficits have been observed in many clinical and neurodevelopmental conditions including; Phenylketonuria (Diamond, Prevor, Callender & Druin, 1997), Autistic Spectrum Disorder (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009; Ozonoff, Pennington, & Rogers, 1991; Hughes, Russell, & Robbins, 1994) and Attention Deficit Hyperactivity Disorder (Happé, Booth, Charlton, & Hughes, 2006; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). The significance of EF abilities and the impact of EF deficits makes it necessary to understand the factors that may impact on their development. Although EFs have been demonstrated to be highly heritable (Friedman, Miyake, Young, DeFries, Corley & Hewitt, 2008), social and environmental factors have been shown to impact on EF task performance. For example: family social economic status, family structure, parental responsiveness, (Sarsour, Sheridan, Jutte, Nuru-Jeter, Hinshaw, & Boyce, 2011) and the organisation and predictability of family life (Hughes & Ensor, 2009) have been explored as potentially important variables. Furthermore, premature birth and high levels of

prenatal alcohol use are associated with long-term EF problems (Hughes et al., 2011; Mulder, Pitchford, Hagger, & Marlow, 2009).

The detrimental impact of early childhood maltreatment on overall cognitive functioning has been well established through numerous neuropsychological studies and reviews (Carrey, Butter, Persinger & Bialik, 1995; Nolin & Ethier, 2007; De Bellis, Hooper, Spratt & Woolley, 2009; Hart & Rubia, 2012). Moreover, neurobiological studies have shown considerable evidence that extreme stress, such as child abuse and neglect, during developmental sensitive periods can lead to profound and lasting neurobiological changes (Anda, Felitti, Bremner, Walker, Whitfield, Perry, et al., 2006; Chugani, Behen, Muzik, Juhász, Nagy & Chugani, 2001; Hanson, Adluru, Chung, Alexander, Davidson & Pollak, 2013; Hart & Rubia, 2012). With the knowledge that the EFs begin to develop from early infancy it is plausible that early life maladaptive experiences could impact on their development. In line with this a number of studies have reported severe early life psychosocial deprivation to be associated with disruptions in some EF abilities (e.g. Bauer, Hanson, Pierson, Davidson & Pollak, 2009; Bos, Fox, Zeanah & Nelson, 2009; Colvert, Rutter, Kreppner, Beckett, Castle, Groothues, Sonuga-Barke et al., 2008; Merz & McCall, 2011). These studies have predominantly focused on children raised in socially depriving orphanages who were subsequently adopted internationally. Although this level of psychosocial deprivation is atypical, unfortunately a large number of children experience early life disruption or maltreatment. Children who have been removed from the family home and are in care or adopted are particularly likely to have experienced maltreatment and early life disruption. However, to date there is a paucity of research which has examined EF abilities in these population. Due to the lack of research examining EF skills in children who have experienced early disruption or maltreatment this systematic review aims to collate and compare the current research regarding EF abilities in looked after, adopted and post-institutionalised children. The rationale for comparing these three groups is to enable observations across these populations to see whether EF difficulties may exist and to aid thinking about whether this is specific to type or dose of maltreatment.

2. Methods

2.1 Primary outcomes

The primary aim for this analysis is to extract and synthesise relevant data relating to whether looked after, adopted and post-institutionalised children show deficits on tests of EF. In this review the term ‘post-institutionalised’ refers to a children adopted from socially depriving institutions, ‘adopted’ relates to children adopted from non-institutional settings (e.g. foster care or birth family), and ‘looked after’ denotes those children under the care of the state or local authority (e.g. in foster care or group homes). A secondary aim is to be able to compare across these sub-groups and identify similarities or differences in EF abilities.

2.2 Eligibility criteria for inclusion in the review

2.2.1 Participants

Studies were included in this review if they were assessing EF in children and adolescents under the age of 18 years who had experience of being in foster care, orphanages or who were adopted. Studies were not included if all participants were reported to have comorbid diagnoses likely to impact on their EF abilities for example a diagnosis of Fetal Alcohol Syndrome (Rasmussen, 2005), Post Traumatic Stress Disorder (Beers & De Bellis, 2002), Neurodevelopmental disorders (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009) or traumatic brain injury (Lenvin & Hanton, 2005).

2.2.2 Executive functioning measures

To be included in this review studies had to report assessing EF ability using at least one neuropsychological measure, experimental task or validated EF questionnaire. Furthermore outcome data had to be accessible, either reported in the publication or able to access via contacting the authors. Due to the wide range of assessment tools used both standardised and non-standardised measures were included. However, studies which implemented measures without validated normative data were only included if data was presented for a comparison group to enable interpretation.

2.2.3 Study characteristics

Cross sectional studies, cohort studies and assessment studies published in peer review journals were included in this review. Single case studies or series were excluded. Unpublished dissertations were not included. In addition only journals available in English were included.

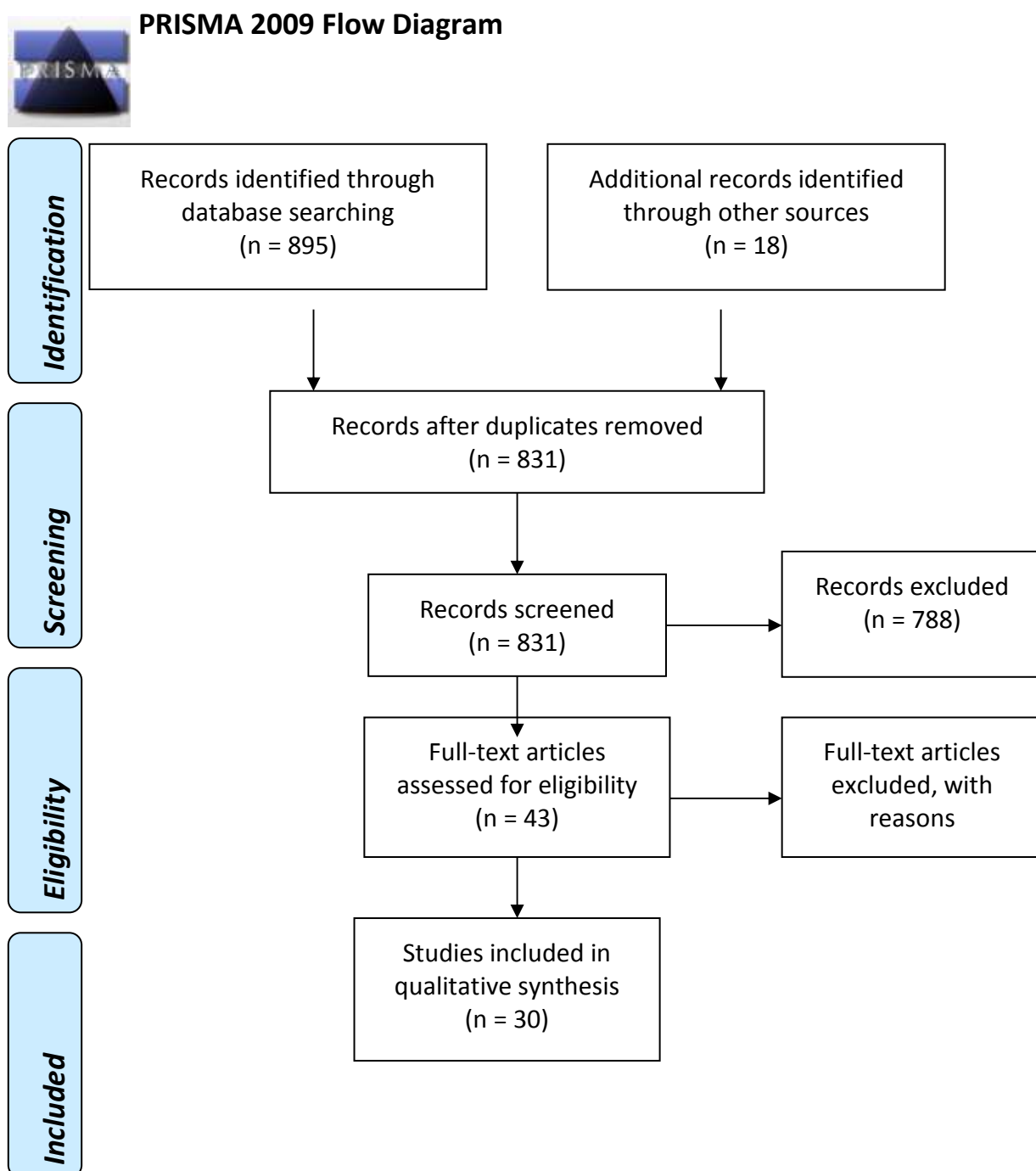
2.3 Identification of studies

To identify studies to be included in this review three electronic database searches were conducted on the 1st April 2015, the searches covered the period up to and including the 1st April 2015. The three electronic databases which were searched were; Ovid, Web of Knowledge and the Cochrane library. For the Ovid search the following databases were selected: Embase, PsychInfo and Medline. A full list of search terms can be found in appendix 1. In addition a hand search was conducted by screening the bibliographies of all papers identified as potentially relevant as well as published reviews in related topics. A search of unpublished 'grey' literature was not conducted.

2.4 Study selection

The first step of selecting appropriate studies was to identify and remove duplicate papers, this was done electronically using the Endnote program and then reviewed by hand (figure 1 displays the PRISMA flow diagram). To identify potentially relevant articles all papers were screened by reviewing the title and journal of publication, if it was unclear whether an article met the inclusion criteria then the abstract was reviewed. Following this 43 journals were identified that potentially met the inclusion criteria. The full texts were downloaded online for these 43 papers through the Kings College London journal subscription, with the exception of 2 papers that were obtained through an inter-library loan system. These texts were reviewed to determine whether the articles met the inclusion criteria and to assess the quality of the articles. This screening process was completed by the primary researcher.

Figure 1 -Displays the PRISMA Flow Diagram for this systematic review.



Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

2.5 Data extraction

Data was extracted by hand from the full texts into an Excel database. The following pieces of information were identified: study design, participant recruitment, participant characteristics, potential confounding variables, assessment tools used to examine EF and the outcomes of assessment.

2.6 Quality assessment of articles

The quality of potential studies was assessed using the Quality Assessment Tool for Quantitative Studies (Effective Public Health Practice Project (EPHPP)). All 30 papers identified as relevant were reviewed using this tool by the primary researcher and classified as strong, moderate or weak. A sub-set of 5 studies were randomly selected and co-rated by a second researcher, inter-rater reliability was assessed using the Kappa statistic.

2.7 Data analysis

The data was initially divided into three categories based on the measures used to assess EF: standardised neuropsychological batteries, experimental tasks and self-report questionnaires. Within these categories the studies were then sorted by the assessed population: looked after, adopted or post-institutionalised children. Within these sub-groups the data relating to EF abilities was extracted, synthesised and summarised. A number of papers reported the neuropsychological profile of participants in the context of imaging studies or broader cognitive or behavioural assessments. These studies were included however only the information relating to EF performance as measured by the aforementioned assessment types was included.

Figure 2- A table of included studies displaying their sample, comparison groups, age range, EF measures used and quality rating

| Study | Study design | Sample | Comparison group | Age | EF Measures | EPHPP Rating |
|--|----------------------------|--|---|---------------------------------|---|--------------|
| Adopted children studies | | | | | | |
| <i>Leve, L. D., et al. (2013). "Using an Adoption Design to Separate Genetic, Prenatal, and Temperament Influences on Toddler Executive Function." Developmental Psychology 49(6): 1045-1057.</i> | Longitudinal | 361 (155 female) | None | Assessed at 9, 18 and 27 months | Experimental tasks: Shape Stroop task, gift delay task | 1 |
| <i>Lewis, E. E., et al. (2007). "The effect of placement instability on adopted children's inhibitory control abilities and oppositional behavior." Developmental Psychology 43(6): 1415-1427.</i> | Cross-sectional comparison | 33 with placement instability (62% female). 42 with 1 stable placement (55% female). | 27 non-adopted (NA) controls (56% female) | 5-6 years | Experimental tasks: Day to night task | 1 |
| <i>Mueller, S. C., et al. (2012). "Incentive effect on inhibitory control in adolescents with early-life stress: An antisaccade study." Child Abuse and Neglect 36(3): 217-225.</i> | Cross-sectional comparison | 17 (10 female) | 29 NA controls (16 females) | Mean 11.3 years (1.9) | Experimental task: incentivised eye saccade task | 1 |
| LAC studies | | | | | | |
| <i>Bucker, J., et al. (2012). "Cognitive impairment in school-aged children with early trauma." Comprehensive Psychiatry 53(6): 758-764.</i> | Cross-sectional comparison | 30 (13 female) | 30 NA control (14 female) | 5-12 years | Experimental task: Wisconsin Card Sort Test (WCST), Continuous Performance Test (CPT) | 1 |
| <i>Pears, K. and P. A. Fisher (2005).</i> | Cross-sectional | 99 (48 female) | 54 NA controls | 3-6 years | Standardised | 1 |

| | | | | | | |
|--|----------------------------|-----------------|----------------------------|------------|---|---|
| "Developmental, cognitive, and neuropsychological functioning in preschool-aged foster children: Associations with prior maltreatment and placement history." <i>Journal of Developmental and Behavioral Pediatrics</i> 26(2): 112-122. | comparison | | (26 female) | | battery: NEPSY (EF domain) Experimental tasks: Stroop task, Card sort task | |
| Pears, K. C., et al. (2010). "Early Elementary School Adjustment of Maltreated Children in Foster Care: The Roles of Inhibitory Control and Caregiver Involvement." <i>Child Development</i> 81(5): 1550-1564. | Cross-sectional comparison | 85 (40 female) | 56 NA controls (26 female) | 3-6 years | Standardised battery: NEPSY (attention/EF domain) Experimental tasks: modified Stroop task, Dimensional change card sort task Questionnaires: Children's behaviour questionnaire. | 2 |
| PI studies | | | | | | |
| Bauer, H., et al. (2009). "Cerebellar Volume and Cognitive Functioning in Children Who Experienced Early Deprivation." <i>Biological Psychiatry</i> 66(12). | Cross-sectional comparison | 31 (16 females) | 30 NA controls (14 female) | 9-11 years | Standardised battery: Cambridge Neuropsychological Test Automated Battery (CANTAB; | 2 |

| | | | | | | |
|---|----------------------------|--|--|------------|---|---|
| | | | | | Cambridge Cognition) IED, SOC, SWM sub-tests | |
| Beckett, C., et al. (2010). "VI. Institutional deprivation, specific cognitive functions, and scholastic achievement: English and Romanian Adoptee (Era) study findings." <i>Monographs of the Society for Research in Child Development</i> 75(1): 125-142. | Cross-sectional comparison | 144 (55% of combined post-institutionalised and internationally adopted groups were female) ^a | 52 adopted from the UK younger than 6months (18 female) pooled with 21 internationally adopted from families | 11 years | Standardised battery: Digit span backwards (WISC-III) Experimental tasks: Tower of London, FAS task. | 1 |
| Behen, M. E., et al. (2008). <i>Incidence of specific absolute neurocognitive impairment in globally intact children with histories of early severe deprivation. Child Neuropsychology</i>, 14(5), 453-469. | Cross-sectional | 85 (47 females) | None | 5-17 years | Experimental tasks: Gordon Diagnostic System (GDS) | 1 |
| Bos, K. J., et al. (2009). "Effects of early psychosocial deprivation on the development of memory and executive function." <i>Frontiers in Behavioral Neuroscience</i> 3. | Cross-sectional comparison | 93 (46 female) | 48 NA controls (23 female) | 8 years | Standardised battery: CANTAB SOC and SWM sub-tests | 1 |
| Bruce, J., et al. (2009). "Disinhibited social behavior among internationally adopted children." <i>Development and Psychopathology</i> 21(01): 157-171. | Cross-sectional comparison | 40 (30 female) | 40 NA controls (30 female). 40 looked after children (30 female) | 6-7 years | Experimental tasks: Go/no go task, 2 delay of gratification tasks | 1 |

| | | | | | | |
|--|---|--|--|--|--|---|
| Cardona, J. F., et al. (2012). "Potential consequences of abandonment in preschool-age: Neuropsychological findings in institutionalized children." Behavioural Neurology 25(4): 291-301. | Cross-sectional comparison | 18 (0 female) | 18 NA controls (0 female) | 7-15 years | Standardised battery: NEUROPSI Attention and Memory Battery. | 1 |
| Chugani, H. T., et al. (2001). Local brain functional activity following early deprivation: a study of postinstitutionalized Romanian orphans. Neuroimage, 14(6), 1290-1301. | Cross-sectional | 10 (4 female) | None | 7-11 years | Experimental tasks: Trails a&b, GDS | 3 |
| Colvert, E., et al. (2008). "Do Theory of Mind and executive function deficits underlie the adverse outcomes associated with profound early deprivation? Findings from the English and Romanian adoptees study." Journal of Abnormal Child Psychology 36(7): 1057-1068. | Cross-sectional comparison and longitudinal | 144 (55% of combined post-institutionalised and internationally adopted groups were female) ^a | 52 adopted from the UK youngers than 6months (18 female). 21 internationally adopted from families | 11 years | Experimental tasks: Stroop | 2 |
| Doom, J. R., et al. (2014). Beyond stimulus deprivation: Iron deficiency and cognitive deficits in postinstitutionalized children. Child development, 85(5), 1805-1812. | Cross-sectional comparison and longitudinal | 55 (29 female) | None | Assessed after adoption and then at mean 3.1 years (0.4) | Experimental tasks: Delay of gratification task, Dimensional Change Card Sort, spin the pots task. | 2 |

| | | | | | | |
|---|----------------------------|---|-----------------------------|---------------------|---|---|
| Eigsti, I. M., et al. (2011). Language and cognitive outcomes in internationally adopted children. Development and Psychopathology, 23(02), 629-646. | Cross-sectional comparison | 46 (23 female) | 24 NA controls (7 female) | 4-13 years | Standardised battery: NEPSY auditory attention Experimental task: Cognitive control task, Go/no-go task, | 2 |
| Eluvathingal, T. J., et al. (2006). "Abnormal brain connectivity in children after early severe socioemotional deprivation: a diffusion tensor imaging study." Pediatrics 117(6): 2093-2100. | Cross-sectional comparison | 7 (5 female) | 7 NA controls (4 female) | Mean 9.7years (2.6) | Experimental tasks: GDS | 2 |
| Groza, V., et al. (2008). Institutionalization, Romanian adoptions and executive functioning. Child and Adolescent Social Work Journal, 25(3), 185-204. | Cross-sectional | 123 internationally adopted children, 81% post-institutionalised (49.6% female) | None | Mean 10 years (1.9) | Questionnaires: Behaviour Rating Inventory of Executive Functioning (BRIEF) parent and teacher versions | 2 |
| Hanson, J. L., et al. (2013). Early neglect is associated with alterations in white matter integrity and cognitive functioning. Child development, 84(5), 1566-1578. | Cross-sectional comparison | 25 ^b | 38 NA controls ^b | 9-14 years | Standardised battery: CANTAB PAL, IED, SOC, and SWM sub-tests | 2 |

| | | | | | | |
|---|----------------------------------|--|--|---|--|---|
| Hostinar, C. E., et al. (2012). "Associations between early life adversity and executive function in children adopted internationally from orphanages." <i>Proceedings of the National Academy of Sciences of the United States of America</i> 109: 17208-17212. | Cross-sectional comparison | 54 (31 females) | 29 NA controls (17 females) | 2.5-4 years | Experimental tasks: DCCS scale, Spin the pots, Delay of gratification | 2 |
| Jacobs, E., et al. (2010). "Developmental and Behavioral Performance of Internationally Adopted Preschoolers: A Pilot Study." <i>Child Psychiatry & Human Development</i> 41(1): 15-29. | Cross-sectional and longitudinal | 37 (25 female) | None | Assessed at adoption and then 4-5 years | Questionnaires: BRIEF-preschool (BRIEF-P) | 2 |
| Loman, M. M., et al. (2013). "The effect of early deprivation on executive attention in middle childhood." <i>Journal of Child Psychology and Psychiatry</i> 54(1): 37-45. | Cross-sectional comparison | 24 (13 female) | 27 NA controls (14 female). 31 internationally adopted from foster care controls (16 female) | 10-11 years | Experimental tasks: Go/No-go task, Flanker task | 2 |
| McDermott, J. M., et al. (2012). "Early adversity and neural correlates of executive function: Implications for academic adjustment." <i>Developmental Cognitive Neuroscience</i> 2: S59-S66. | Cross-sectional comparison | 33 randomised to care as usual (institutional) (13 female). 43 removed from institution and placed in foster care (21 female). | 41 NA control (17 female) | 8 years | Experimental tasks: Go/No-go task | 2 |
| McDermott, J. M., et al. (2013). "Psychosocial deprivation, executive functions, and the emergence of socio-emotional behavior problems." <i>Frontiers in Human Neuroscience</i> 7. | Cross-sectional comparison | 49 randomised to care as usual (institutional) (25 female). 54 removed from institution and placed in foster care (28 female). | 47 NA control (26 female) | 8 years | Experimental tasks: Flanker task | 2 |

| | | | | | | |
|---|---|---|---|----------------------|---|---|
| Merz, E. C. and R. B. McCall (2011). "Parent ratings of executive functioning in children adopted from psychosocially depriving institutions." <i>Journal of Child Psychology and Psychiatry</i> 52(5): 537-546. | Cross-sectional | 288 aged 6-18 years (167 female). 130 aged 2-5 years (71 female) | None | 2-18 years | Questionnaires: BRIEF and BRIEF-P | 3 |
| Merz, E. C., et al. (2013c). <i>"Inhibitory Control and Working Memory in Post-Institutionalized Children."</i> <i>Journal of Abnormal Child Psychology</i> 41(6): 879-890. | Cross-sectional comparison and longitudinal | 75 (46 female) | 133 NA controls (68 female). | 8-17 years | Standardised battery: CANTAB SWM, and SSP sub-tests | 2 |
| Merz, E. C., et al. (2013a). <i>"Parent-Reported Executive Functioning in Postinstitutionalized Children: A Follow-Up Study."</i> <i>Journal of Clinical Child and Adolescent Psychology</i> 42(5): 726-733. | Cross-sectional comparison and longitudinal | 471 (56% female), 150 selected for longitudinal analysis | 111 Globally deprived adopted children (49% female) | 6-18 years | Questionnaires: BRIEF | 3 |
| Pollak, S. D., et al. (2010). <i>"Neurodevelopmental Effects of Early Deprivation in Postinstitutionalized Children."</i> <i>Child Development</i> 81(1): 224-236. | Cross-sectional comparison | 48 (24 female) | 44 NA controls (20 female). 40 Early adopted controls (19 female) | 8-9 years | Standardised battery: CANTAB IED and SOC sub-tests | 1 |
| Sonuga-Barke, E. J. S. and Rubia, K. (2008). <i>"Inattentive/overactive children with histories of profound institutional deprivation compared with standard ADHD cases: a brief report."</i> <i>Child Care Health and Development</i> 34(5): 596-602. | Cross-sectional comparison | 13 who met the criteria for Inattention/Overactivity/Impulsiveness (I/OA) (7 female). 22 not I/OA (10 female) | 20 NA with ADHD (3 female) | Mean 13 years | Experimental tasks: From the MARS battery; Go/no go task, Tracking stop signal, Switch task | 3 |
| Tottenham, N., et al. (2010). <i>"Prolonged institutional rearing is associated with</i> | Cross-sectional comparison | 19 completed the neuropsychological | 27 completed neuropsychologic | Mean 8.2 years (1.9) | Experimental tasks: | 1 |

| | | | |
|--|------------------------|---------------------------|-----------------------|
| <i>atypically large amygdala volume and difficulties in emotion regulation."</i> <i>Developmental Science 13(1): 46-61.</i> | assessment (13 female) | al assessment (16 female) | Emotion go-no-go task |
|--|------------------------|---------------------------|-----------------------|

^a Beckett et al (2010) and Colvert et al (2008) used the same participants but reported different measures therefore both papers were included in this review. Of note the Beckett et al study includes Stroop outcomes however these were previously reported in Colvert et al (2008), and therefore were excluded to prevent duplication within this review.

^b It was not possible to extract information regarding number of males and females who took part in the study.

3. Results

3.1 Search Results

This systematic review includes 30 papers that were published by the 1st April 2015. The systematic search initially identified 895 records from three electronic database searches, a further 18 papers were included following a hand search of relevant texts and reviews. After the removal of duplicate texts, 831 records were screened and 788 texts were excluded for not meeting the inclusion criteria described in section 2.2. 43 full texts were reviewed which lead to the exclusion of 13 studies. Reasons for excluding these studies included; the assessment not containing a measure of executive functioning or the sample being children with a history of maltreatment but not specifically placed outside of the biological home (n=12). One study was excluded as it focused on maternal substance misuse and all children in the sample had been exposed to substances in utero.

3.2 Study characteristics

All 30 studies included were cross-sectional in design, 23 (76.7%) included at least one comparison group and seven (23.3%) completed a longitudinal analysis. The majority of the studies (n=25, 83.3%) took place in the USA, three studies (10%) were conducted in the UK, one occurred in Brazil and one in Colombia. Of the 30 studies identified, the majority (n=24, 80%) focused on children who were adopted internationally and had experienced psycho-socially depriving institutional care or lived in an orphanage. These studies will be abbreviated to post-institutionalised (PI) samples. Of the remaining 10 studies three (10%) explored children adopted within the country (henceforth labelled as 'Adopted') and three (10%) studied children in care (henceforth labelled as 'LAC'). Just under half of the studies (n=14, 46.7%) focused on middle childhood (approximately 7-11 years), 20% (n=6) on early childhood (≤ 6 years) and only one study focused on adolescence (≥ 12 years). The remaining 9 studies (30%) included children from across two or more of these categories. Only 11 studies (36.6%) reported effect sizes for their EF findings, where possible these will be described.

A broad range of methodology was used to assess EF in these studies. This included whole or sections of neuropsychological batteries (20% n=6), experimental tests (53.3%, n=16), and parent or teacher self-report measures (13.3%, n=4). 13.3% of the studies (n=4) used more than one of the aforementioned assessment techniques. Figure 2 outlines the measures used to assess EF for each study. Because of the broad range of methodology the studies shall be organised by assessment modality as well target population to enable comparisons across similar types of measures. Some studies used more than one of these assessment modalities and therefore will be described in more than one section.

3.3 Quality of included studies

The quality of included studies was assessed using the guidelines outlined in the Quality Assessment Tool for Quantitative Studies (EPHPP) by the primary researcher. Utilising this measure nearly half of the studies (46.6%, n=14) were classified ‘moderate’, 40% (n=12) as ‘strong’ and 13.3% (n=4) were rated as ‘weak’. The inter-rater reliability for the two raters was found to be Kappa = 0.68, 95% CI (0.44, 0.93).

3.4 Standardised neuropsychology batteries

3.4.1 PI studies

Eight studies used tests from standardised neuropsychological batteries to assess EF in PI children (see appendix 2 for a description of all standardised tests used).

The most frequently selected neuropsychological battery used to assess EF in PI children has been the Cambridge Neuropsychological Test Automated Battery (CANTAB; Cambridge Cognition), with 5 studies using a range of its’ sub-tests (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Merz et al., 2013c and Pollak et al., 2010). The CANTAB has been well validated for use with children (Luciana and Nelson, 2002). The following sub-tests have been used experimentally to measure aspects of executive functioning: Intra-Extra Dimensional Set Shift

(IED), Stockings of Cambridge (SOC), Spatial Working Memory (SWM) and Spatial Span (SSP).

The IED sub-test measures rule acquisition and manipulation. On the IED task Bauer et al (2009) and Hanson et al (2013) both found that PI children in their mid-childhood to early adolescence performed statistically significantly poorer ($p < .05$) than NA typically developing children. Pollak et al (2010) found that 8-9 years old PI children performed poorer on IED than controls and slightly worse than children adopted internationally prior to the age of 8 months, however neither of these effects reached statistical significance.

The SOC sub-test is a computerised variation of the Tower of London test, which predominantly assesses spatial planning. The performance of PI children on this task has been variable. Bauer et al (2009) and Hanson et al (2013) found PI samples to complete statistically significantly fewer trials correctly within the minimum number of moves compared to NA typically developing children ($p < .05$). However two other studies observed no difference in performance between PI and NA children (Bos et al., 2009; Pollak et al., 2010) and PI and children adopted internationally before the age of 8 months (Pollak et al., 2010). All four studies were examining PI children of similar age ranges, so variation in performance is unlikely to be accounted for by age. In addition the studies by Pollak et al, Bauer et al and Hanson et al all displayed similar durations of institutionalisation (mean time between 23-31 months) and children were adopted from a similar range of countries. Of note the Bos et al study only assessed Romanian PI children and the mean duration of institutionalisation was unclear. A number of potentially confounding variables were inconsistently controlled for which may have impacted on the outcomes, for example none of these studies appeared to assess whether IQ could be influencing performance and only Pollak et al reported mean IQ scores.

The SWM task looks at the ability to retain and manipulate spatial information. Four out of four studies of PI children between the ages of 8 and 14 years found PI samples to perform statistically significantly poorer compared to NA controls ($p < .01$) on the SWM task (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Pollak et al., 2010). PI children were observed to make statistically significantly more errors

than children internationally adopted before the age of 8 months ($p < .01$), these early adoptees performed similar to the NA sample (Pollak et al., 2013). Merz et al (2013c) compared PI children aged 8-17 years who were adopted ≤ 9 months with those adopted ≥ 14 months. In this comparison no significant differences were observed on the number of errors made on the SWM task ($d = 0.16$). Both Merz et al (2013c) and Bos et al (2009) identified that PI children with low birth weight made significantly more errors on the SWM task.

The SSP test is a visuospatial task that assesses working memory capacity. Only one study used the SSP test (Merz et al., 2013c). In this study PI children adopted ≥ 14 months were found to have a significantly smaller spatial span length ($p < .001$, $d = 0.65$) compared to both PI children adopted ≤ 9 months and NA children whilst controlling for age at assessment. PI children adopted ≤ 9 months were observed to have a similar spatial span length to the NA control sample.

Cardona et al (2012) used the NEUROPSI Attention and Memory Battery (Ostrosky-Solís, Esther Gómez-Pérez, Matute, Rosselli, Ardila & Pineda, 2007) to compare the cognitive performance of 18 PI males aged 7-15 years in Colombia with matched controls. The NEUROPSI has been validated and standardised for Spanish populations. On this battery the PI males performed worse than the control group on concept formation and inhibitory tasks ($p < .05$), no difference was observed on verbal and visual fluency tasks. However this study only included male participants and gender effects have been observed on some cognitive tasks therefore it is difficult to generalise the findings to the female PI population.

Eigsti et al (2011) measured cognitive control for 46 PI children and 24 NA controls aged 4-13 years using the auditory attention task from the NEPSY (Korkman, Kirk & Kemp, 1998). This sub-test requires the use of selective and sustained auditory attention. On this test PI children performed significantly poorer than the comparison group ($p < .05$, $\eta^2_p = 0.07$). In addition a weak correlation was observed between duration of institutionalisation and sustained attention ($p = .07$).

Beckett et al (2010) administered the reverse digit span test from the Third Edition of the Wechsler Intelligence Scale (WISC-III, Wechsler, 1991). On this sub-test PI

children aged 11 years who experienced >6 months of deprivation performed poorer than a pooled comparison group, however this difference did not reach statistical significance ($p=.06$, $\eta^2_p = 0.06$).

Overall on standardised neuropsychology sub-tests, the included studies suggest that PI children may perform poorer on tasks assessing rule acquisition and manipulation (IED), and the retention and manipulation of spatial information (SWM). There was limited evidence that spatial span (SSP), concept formation and inhibition (NEUROPSI), and selective and sustained auditory attention (Auditory attention task) may also be impacted. However due to the small number of studies which used those sub-tests it is difficult to draw generalizable conclusions at this stage. The evidence assessing spatial planning (SOC) was contradictory and it is unclear whether PI children may struggle with this aspect.

3.4.2 Studies of adopted children

This systematic search did not identify any studies assessing the executive functioning of adoptive children using standardised neuropsychological batteries.

3.4.3 LAC studies

Three studies used tests from standardised neuropsychological batteries to assess EF in the LAC population.

Two LAC studies were identified which used the NEPSY attention/executive function core domain as part of their EF assessment (Pears & Fisher, 2005; Pears et al., 2010). However these studies combined the NEPSY scores with other experimental and parent report measures to create composite scores, the NEPSY performance was not described separately. Pears and Fisher (2005) combined the NEPSY, Stroop Task and a Card Sort Task performance to create a composite EF score. Pears et al (2010) combined the NEPSY¹, modified Stroop task, Dimensional Change Card sort and the caregiver reports from the Inhibitory Control and Attention

¹ In the Pears et al (2010) study only the children aged 3 and 4 years at assessment completed the NEPSY domain (45 of the 85 participants).

Focusing scales of the Children's behaviour Questionnaire to create an inhibitory control composite score. Both studies compared young foster children aged 3-6 years with a matched non-maltreated group of children residing with their biological families. Pears and Fisher (2005) found a non-significant difference between groups on EF composite scores ($p=.07$). Additional post-hoc analyses discovered a trend that LAC children who had experienced more than the average number of placement moves prior to the assessment had lower scores on the EF composite. Pears et al (2010) found that LAC children scored significantly poorer on the inhibitory control composite ($p<.01$). Bivariate correlation highlighted that inhibitory control was significantly negatively associated with a history of maltreatment and foster placement and significantly positively associated with measures of school adjustment.

Bucker et al (2012) compared LAC children in Brazil with a history of early trauma with age-matched controls (age range 4-12 years). To assess executive functioning they used the Digit Span Test. They observed that the LAC group performed significantly poorer ($p<.05$) on Digits Span, Digits forward and Digits backwards, further exploration showed a significant interaction between psychiatric symptoms and performance on Digits span ($p=.01$, $r^2 = 0.16$) and Digits forward ($p=.01$, $r^2 = 0.16$) in this population.

Due to the few studies using standardised assessment sub-tests it is difficult to draw reliable conclusions regarding the performance of LAC samples. There is some initial evidence that young LAC samples may have difficulties with EF and inhibitory control, and that middle childhood may be associated with digit span difficulties.

3.4.4 Summary of standardised neuropsychology batteries

Overall the included studies using standardised neuropsychology sub-tests demonstrated EF difficulties for PI children, the evidence was strongest for tasks assessing rule acquisition and manipulation, and the retention and manipulation of spatial information. The few identified LAC studies suggested potential difficulties

with EF, inhibitory control and digit span. No studies of adopted children were identified that used standardised neuropsychological measures.

3.5 Experimental measures

3.5.1 PI studies

Fourteen of the identified PI studies included at least one experimental task to measure EF.

Four studies reported performance for a version of the Go/no-go task, this task generally involves participants inhibiting a pre-potent response and selectively responding to a target stimuli. McDermott et al (2012) and Loman et al (2013) both found that PI and control populations (aged 8 and 10-11years respectively) were more accurate for 'go' than 'no-go' trials ($p < .001$). However, within the 'go' condition PI children who remained in institutional care performed less accurately ($p < .05$) than PI children who moved to foster care (McDermott et al., 2012), internationally adopted children from foster care (Loman et al., 2013) and never institutionalised control groups (Eigsti et al.,² 2011; Loman et al., 2013; McDermott et al., 2012). This pattern of results was hypothesised to indicate underlying difficulties in sustained attention as opposed to selective attention or response inhibition (Loman et al., 2013; McDermott et al., 2012). McDermott et al (2012) also found that a PI group who stayed in institutional care displayed slower response times ($p < .05$) than a PI group who moved to foster care and NA control groups for 'no-go' trials. However, Eigsti et al and Loman et al tested reaction speed but found no significant differences between PI and both internationally adopted children from foster care and NA controls. Loman et al noticed an interaction of gender within the reaction time, with PI males performing significantly slower ($p < .05$) than NA males, however this effect was not observed for PI females. A relationship between performance and duration of institutionalisation ($p < .05$) was observed by both Eigsti et al (2011) and Loman et al (2013) with children staying in institutions longer, responding slower. Tottenham et al (2010) employed an emotion go/no-go task to measure self-regulation in emotional contexts. They observed that all children (PI

² $\eta^2_p = 0.08$

and never institutionalised controls, mean age 8.2 years) were more accurate and faster in performance for positive stimuli (positive facial expressions). However PI children who spent the longest time in care made significantly more false alarm errors ($p < .05$) on the negatively valenced faces.

Three studies assessing children between the age of 5 and 17 years have employed the Gordon Diagnostic System (GDS, Gordon, 1982) to gain a measure of EF (Behen et al., 2008; Chugani et al., 2001; Eluvathingal et al., 2006). The GDS is a computerised assessment of attention and self-control. Behen et al (2008) found that for PI children rated as globally intact ($IQ < 85$) 24% ($n=13$) were rated as impaired on one or more of the EF domains. Chugani et al (2001) and Eluvathingal et al (2006) both looked at the neurocognitive profile of small groups of PI children compared to normative data ($n=10$ and 7 respectively). Using the GDS Chugani et al identified severe impairments in impulsivity and mild impairments in sustained attention, Eluvathingal et al found mild impairments in impulsivity and low average performance in sustained attention.

Two studies reported performance on the Flanker task (Loman et al., 2013; McDermott et al., 2013). The Flanker task assesses response inhibition in the context of distracting stimuli. Both studies found that PI and control groups were more accurate and faster on congruent trials than incongruent trials ($p < .05$). Loman et al identified that the PI participants (aged 10-11 years) were less accurate than control groups ($p < .001$), however McDermott et al only found this effect for incongruent trials ($p < .001$), where a PI group (aged 8 years) who remained in institutions and a PI group who moved to foster care were both less accurate than NA control. In addition Loman et al did not observe any differences in reaction time, whereas McDermott et al found that the both PI groups were slower than NA controls on congruent trials ($p < .05$).

Sonuga-Barke et al (2008) used three computerised tasks from the Maudsley Attention and Response Suppression battery³ (MARS, Rubia et al., 2001, 2007) to compare PI children with a history of Inattention/Overactivity/Impulsiveness (I/OA),

³ This study was included under the experimental measures section as no normative data could be found on the MARS battery at time of the writing of this review.

PI children without I/OA and ADHD NA controls (mean age 13 years). The tasks used were the Stroop Signal task, Go/No-Go task and Switching task. Although no statistically significant differences were observed, the PI I/OA group displayed greater impairments on these tasks than either the ADHD or PI control groups, whose performance was similar. Colvert et al (2008) used the Stroop task (Stroop, 1935) to assess the ability to inhibit pre-potent responses at age 11 years. This study compared Stroop performance of; PI children, internationally adopted without a history of institutionalisation and children adopted within the UK before the age of 6 months. Significant differences ($p < .001$, $\eta^2 = 0.12$) were found between the groups, with the PI group displaying more Stroop errors than either control group. EF performance correlated with duration of deprivation ($p < 0.01$), as measured by age of entry to the UK, as well as weight and head circumference at entry ($p < .05$ and $p < .01$). PI children who spent the longest time in institutions displayed the poorest EF performance and this effect remained when IQ was controlled.

Chugani et al (2001) employed the Trails A&B tasks as a measure of EF. These tasks involve maintaining visual attention, following a sequence and set-switching. Chugani et al reported that the mean performance of the 10 PI participants fell within the mild impairments range.

Beckett et al (2010) used the FAS task (Benton and Hamsher, 1977) which assesses verbal fluency and the Tower of London paradigm (Shallice, 1982) which tests planning efficiency. On the FAS, PI children aged 11 years who experienced >6 months of deprivation and displayed 'deprivation specific psychological patterns' did not display significant differences on total correct words ($\eta^2_p = 0.03$) but reported significantly more incorrect words ($p < .05$, $\eta^2_p = 0.05$). This was in comparison with a pooled control group (see figure 2). Statistically significant difficulties were also identified on the Tower of London total correct solutions score ($p < .01$, $\eta^2_p = 0.07$).

Three studies combined a range of experimental tasks to create an EF or inhibitory control composite score (Bruce et al., 2009; Doom et al., 2014; Hostinar et al., 2012) (see figure 2 for a breakdown of individual tasks included). Hostinar et al and Doom et al both compared toddler's aged ≤ 4 years whereas Bruce tested children aged 6-7

years. On composite scores PI children performed statistically significantly poorer ($p < .01$) than foster children (Bruce et al., 2009) and NA children ($\eta^2 = 0.09$, Bruce et al., 2009; $\eta^2_p = 0.24$, Hostinar et al., 2012). Bruce et al (2009) found no differences on performance between the foster care and NA control groups. In addition inhibitory control scores were identified to mediate the relationship between disinhibited social behaviour and length of time in institutional care. Doom et al (2014) found that duration of institutional care and iron deficiency at adoption predicted variation in EF performance, however this effect did not remain significant once the IQ was included as a covariate. In line with this Hostinar et al (2012) did not observe an effect of duration of institutionalisation on EF ability after controlling for IQ ($r_p = 0.05$). However positive correlations ($p < .05$) were found between ratings of quality of institutional environment and EF scores ($r_p = 0.37$), and time spent with birth family before adoption and EF scores ($r = 0.29$).

A wide range of experimental tasks were used to assess EF in the PI population. On tasks requiring children to inhibit pre-potent responses (e.g. Go/No-go, Stroop task) PI children appeared to perform less accurately and slower than NA controls. Results relating to the Flanker task were varying, although some difficulties in task performance were observed it is unclear under which conditions this might occur. On the GDS, a measure of sustained attention and self-control, the PI samples were displaying some mild to severe impairments, however the studies described had small sample sizes and did not include comparison groups, making it difficult to draw reliable conclusions. In addition one study identified some specific verbal fluency and planning difficulties. Composites of experimental tests suggested that PI toddler's aged ≤ 4 years might display some EF difficulties. From the experimental studies it is unclear whether duration of institutionalisation may moderate EF ability due to the variability in results.

3.5.2 Studies of adopted children

Three studies assessing adopted children utilised experimental measures (Leve et al., 2013; Lewis et al., 2007; Mueller et al., 2012).

Leve et al (2013) assessed effortful attention (using the shape Stroop task) and delay of gratification (using the gift delay task) for adopted toddlers (≤ 27 months). In this study latent growth modelling identified that toddler effortful attention was positively associated ($p < .001$) with toddler language development, birth mother verbal IQ and gender (female). Delay of gratification was positively associated ($p < .01$) with language development and gender (female). Lewis et al (2007) identified that adopted children aged 5-6 years who had experienced more than one placement and had a history of pre-adoption placement instability performed poorer ($p < .01$, $\eta^2 = 0.20$) on a laboratory measure of inhibitory control (the day to night task, Gerstadt et al., 1994) than adopted children without a history of placement instability or NA controls. This effect remained following controlling for age at assessment and working memory performance. Mueller et al (2012) examined the impact of monetary incentives on prosaccade and antisaccade tasks for adopted children and NA controls (mean age 11 years). The results found that adopted children responded slower on all trial types ($p < .05$), in addition unlike the control group they failed to show an improvement in performance on antisaccade trials that were incentivised ($p < .05$). As this effect was not observed for incentivised prosaccade trials they concluded that this diminished reward sensitivity related to underlying inhibitory control deficiencies as opposed to a reduced attention capacity.

Overall few studies have assessed EF in adopted children using experimental tasks, of those that have, differences in test selection prevents reliable comparisons.

3.5.3 LAC studies

Only one study was identified to use experimental tasks to assess EF in LAC.

Bucker et al (2012) compared LAC children in Brazil with a history of early trauma with age-matched controls, their assessment included the Wisconsin Card Sort Test (WCST) and the Continuous Performance Test (CPT). In this study the LAC group displayed significantly more ($p < .05$) CPT commission errors than the control group. Differences were not observed for other parts of the assessment. As this was the only study included which used experimental measures to assess EF, it is not possible to draw generalizable conclusions.

3.5.4 Summary of experimental measures

Experimental tasks were the most frequently used means of assessing EF across all three populations ($n = 18$), however the tasks used varied greatly. PI children demonstrated some difficulties on tasks requiring the inhibition of pre-potent responses, sustained attention and self-control, additionally one study identified verbal fluency and planning difficulties. Adopted studies showed differences in incentivised task performance, furthermore a history of pre-adoption placement instability was associated with poorer inhibitory control performance. One LAC study showed more errors on a selective and sustained attention task.

3.6 Parental report measures

3.6.1 PI studies

Four studies used parental report measures to assess EF in PI children; all of these studies used the BRIEF questionnaire.

The BRIEF (Gioia, Isquith, Guy & Kenworthy, 2000) and BRIEF-P (Gioia, Espy & Isquith, 2005) questionnaires have been used to assess EF in PI children from age 2 to 18 years (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall, 2011; Merz et al., 2013a). These questionnaires have demonstrated adequate reliability and validity (Strauss, Sherman & Spreen, 2006; Sherman & Brooks, 2010).

Groza et al (2008) compared children adopted from Romania with and without a history of institutionalised care. Adoptive parents were found to score all children more highly (more problems) than teachers for both the Behavioral regulation (BRI) and Metacognition (MCI) indices ($p < .005$). An effect of pre-adoptive placement was observed, on the BRI parents rated children who lived in family settings at 0-1 months as significantly lower (better) than those in non-family settings at the age of 3 years ($p < .05$). Additionally teacher rated BRI and MCI scores for children who lived in family settings at 0-1 months were significantly lower than those moving to family settings at age 1-6 or 6-12 months, all of these groups scored lower than children in non-family settings at the age of 3 years ($p < .001$). A similar pattern was

found by Merz and McCall (2011), they identified a ‘step-like’ association between age of adoption and EF scores with children adopted after 18 months showing more difficulties than those adopted before 18 months and the never institutionalised normative data ($p < .05$). Furthermore hierarchical multiple regressions identified an interaction between age of adoption, age of assessment and BRIEF scores, it indicated that the onset of adolescence (defined as age 12) corresponded to higher EF problems in children adopted ≥ 18 months. Merz et al (2013a) followed up on the Merz and McCall (2011) study to examine continuity in EF following 2 years and to compare the PI group with a group of children who had experienced early global deprivation. The mean Global Executive Composite (GEC) remained fairly constant over time and the observation of higher EF problems in children adopted ≥ 18 months was replicated ($d = 0.56 - d = 0.61$). In addition globally deprived children were found to have significantly higher levels of EF problems ($p < .001$, $d = 0.44$) than the PI sample. The globally deprived children adopted < 9 months or ≥ 18 months had higher levels of EF problems than the BRIEF standardisation sample ($p < .05$), however this effect was not observed for children adopted aged 9-17 months.

On the BRIEF-P Merz and McCall (2011) observed no significant differences between pre-school aged PI children and normative data and no correlations between age of adoption and BRIEF-P scores. However Jacobs et al (2010) found that age of arrival strongly predicted all BRIEF-P areas of performance ($p < .05$) for PI children⁴ aged 5 years, with younger age being associated with better performance. Although Jacobs et al did not compare this sample to normative data they did report that 11% of children scored in the ‘problem range’ for the BRIEF-P GEC. Jacobs et al also identified borderline negative correlations ($r = -.35$ to $r = -.41$) between arrival visual reception score and three BRIEF sub-scales (inhibition, working memory, planning/organizing ability). In addition children who qualified to receive an early intervention service displayed poorer BRIEF-P scores ($p < .05$).

In summary parent and teacher reports have consistently identified above average EF and attention difficulties for PI children aged 5-18 years on the BRIEF. Furthermore it appears that longer duration of institutionalisation may be associated with poorer

⁴ Although the study did not explicitly recruit PI children 94% of the sample were adopted internationally from orphanages.

reported EF ability on the BRIEF. However it is unclear whether children aged 2-5 years display EF difficulties and whether these are related to length of institutionalisation.

3.6.2 Studies of adopted children

This systematic search did not identify any studies that used only parental report to assess EF in adopted children.

3.6.3 LAC studies

No studies using only parental report to assess EF in the LAC population were identified in this search.

3.6.4 Summary of parental report measures

Studies utilising parental report measures were only identified for the PI population. These studies showed reported EF difficulties for children older than 5 years of age and performance was linked to duration of institutionalisation.

4. Discussion

4.1 Summary of results

The primary aim of this systematic review was to extract and synthesise relevant data relating to whether LAC, adopted and PI children show deficits on tests of EF. The majority of studies across all three populations used experimental measures to assess EF ($n = 18$). Most studies examined EF with PI children ($n = 24$) and although a wide range of tasks were used, a number were repeated allowing some specific comparisons to occur, especially on several of the CANTAB sub-tests (IED, SWM and SOC). A common theme identified across the PI studies was examining the effect of duration of deprivation on functioning ($n = 15$). Of interest a total of only 6 studies were identified which examined EF in the LAC and adopted populations. Considering that more LAC and adopted children reside in the UK than PI children, this review highlights the imbalance in allocation of research resources, and the difficulties in accurately generalising the current findings to the wider population of LAC and adopted children. Furthermore as these limited number of studies used a broad range of tools to assess EF, it was difficult to draw reliable conclusions for these populations.

The second aim of this systematic review was to compare across these three populations to identify similarities or differences in EF abilities. It was not possible to complete this aim due to the paucity of research looking at EF abilities in the adopted and LAC populations.

4.1.1 LAC studies

From the three studies that were identified assessing LAC samples there appeared some initial evidence that young LAC populations (3-6 years) might have difficulties with EF and inhibitory control. However at age 6-7 years Bruce et al (2009) found no differences on an EF composite between the LAC and NA control groups.

4.1.2 Studies of adopted children

Within the adoption research one study suggested the existence of inhibitory control difficulties, another identified a reduction in reaction time on eye saccade trials and a third identified potential variables that may influence delay of gratification and effortful attention development. Children adopted <6 months of age were included in comparison groups (Beckett et al., 2010; Colvert et al., 2008) and displayed significantly better performance on EF tasks compared to PI children. However as NA controls were not included and all children were adopted <6 months, it is difficult to draw conclusions about EF functioning for this comparison sample.

4.1.3 PI studies

A much larger research base was identified for the PI children. Studies employing parental report measures (n = 4) consistently identified above average EF difficulties in PI children aged >5 years, although it is unclear whether a similar pattern is seen for children <5 years. Furthermore in parental reported EF ability appeared to be associated with duration of institutionalisation, with later adoption being linked to poorer EF.

Laboratory based assessment measures were more variable in their findings and many measures were only used in one study making comparisons and synthesis difficult. Several studies provided evidence for PI children performing poorer on tasks assessing: working memory, rule acquisition and reversal, retention and manipulation of visuospatial information, and the inhibition of pre-potent responses. Additionally, composites of experimental tests suggested that PI toddlers might display some EF difficulties. However, studies looking at response inhibition and planning abilities were inconstant in findings, with some suggesting difficulties and others reporting no significant differences between PI and NA controls. With regards to the association between duration of institutionalisation and EF, this again was inconclusive with the same number of analyses suggesting an association as those failing to replicate the finding.

Overall, taking into account the results from both the parental report and laboratory measures for the PI studies it appears that PI children do exhibit some difficulties with EF, however the specific EF difficulties are unclear.

4.2 Limitations of included studies

Due to small number studies identified through the systematic search it was decided to include studies rated as poorer in quality (n=4, see figure 2). Common components that were rated as ‘weak’ in these studies included low participation rates and lack of description of controlling for potential confounders. These studies may be more liable to a range of biases and therefore it is important to keep this in mind when interpreting these findings. In addition two of the studies included explored EF in samples of ten or less (Chugani et al., 2001; Eluvathingal et al., 2006), and may be less likely to accurately represent the target population.

A key issue for studies attempting to examine EF is the validity of the tools and measures used. There are a wide range of EF assessment measures available however the sensitivity and ecological validity of these have been questioned. It is well reported that individuals with frontal lobe damage can show intact performance on EF tasks but display debilitating effects on daily life (e.g. Eslinger & Damasio, 1985; Levine, Robertson, Clare, Carter, Hong, Wilson et al., 2000). It has been postulated that EF measures need to be complex, novel and involve multiple processes (Anderson, 2002), however it is difficult to separate executive and ‘non-executive’ functions in more complex, ecological valid tasks. Additional problems related to applying standardised assessment tools specifically with PI populations have been highlighted (MacLean, 2003). For example Mainemer, Gilman & Ames (1998) found that PI children were scored more highly on Distractibility/Hyperactivity subscale of the Parenting Stress Index (Abidin, 1990) than NA controls, despite contradictorily being described as passive and quiet. On further review it appeared that PI children were rated highly on the distractibility items but not the hyperactivity items of the scale. Therefore taking quantitative results at face value could indicate a different clinical picture of problems. Bearing these difficulties in mind it may be over simplistic for studies to solely rely on tasks hypothesised to quantify EF and a more accurate picture of EF might be gathered

through combining multiple sources of information (e.g. including parental report and observations, Anderson, 2002). Although most studies included in this review (n=20) used more than one single EF task or questionnaire, only one study gathered data using a combination of EF tasks and parental report (Pears & Fisher, 2005). As a result it is possible that some of the studies may have demonstrated either false negatives or false positives in detecting EF difficulties, particularly given the varied and heterogeneous nature of EF.

4.3 Limitations of the current review

Only one reviewer was involved in the initial search and selection of studies to be included in this review. It is possible that using one reviewer may have influenced the selection of papers to be included in the review. To maximise the systematic protocol and reduce potential selection bias a strict exclusion and inclusion criteria was adhered to (as described in section 2.2). Furthermore, to ensure the inclusion of as many relevant studies as possible all references within the identified papers and related published reviews were considered.

A difficulty of reviewing EF as a concept is that it is a wide ranging construct that consists of a broad range of processes which overlap with a number of other cognitive processes (e.g. attention and emotion regulation). This is problematic as searching for all potential processes under the EF umbrella is likely to amass a vast number of heterogeneous studies. In an attempt to focus this review only studies that explicitly reported assessing EF or an EF process in the article were included. Furthermore only the EF measures were extracted from the studies. This means that studies assessing aspects of EF that were not described as an EF may have been missed. For example Merz et al (2013b) identified attention difficulties in PI children on the Connors Parent rating Scale (CPRS, Connors, 2000), however this study was not incorporated as it did not aim to assess EF and therefore it failed to fit the inclusion criteria.

An additional factor that may have impacted on the reliability of this review was the decision to only include studies published in peer-reviewed journals. This means

that relevant ‘grey’ literature might have been missed. Excluding ‘grey’ literature can lead to overestimation of the effectiveness of interventions (Hopewell, McDonald, Clarke & Egger, 2007; McAuley, Tugwell & Moher, 2000) and may lead to a reporting bias. The publication bias for studies describing a significant effect to be more likely to be published has been well reported (Turner, Boutron, Hróbjartsson, Altman & Moher, 2013). To help determine whether a publication bias occurred a funnel plot was created for all the key EF measures described for 14 of the 23 studies that contained a comparison group⁵. The funnel plot displayed a slight skew to the left suggesting studies reporting larger effect sizes might be missing (see appendix 3).

4.4 Findings in context of EF literature

The identification of likely EF difficulties in children who have experienced early life disruption is in line with previous reviews of both behavioural and neuroimaging studies. These studies have identified that a child’s early environment can impact on broader cognitive development as well as specifically EF development (Hughes, 2011; Irigaray, Pacheco, Grassi-Oliveira, Fonseca, Leite & Kristensen, 2013; Petchel & Pizzagalli, 2011) and associated neurobiological structures (Hart, 2012; Nelson et al., 2011). Furthermore this is in agreement with ideas relating to the impact of developmental stress on the stress response systems. Gunnar and Quevedo (2007) provided an overview of the impact of early stress on neurobiology. They concluded that sensitive periods of brain plasticity and development appear to be more vulnerable to the negative effects of early chronic stress and that disruptions in caregiver relationships and provision of care can contribute to changes in physiological and behavioural responses (see Gunnar & Quevedo, 2007 for a review). As EF deficits have also been observed in common neurodevelopmental conditions such as Autistic Spectrum Disorder (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009; Hughes, Russell & Robbins, 1994; Ozonoff, Pennington & Rogers, 1991) and Attention Deficit Hyperactivity Disorder (Happé, et al., 2006; Willcutt et al., 2005), it is possible that children who have experienced early life disruption may display some similarities in clinical presentation. The findings of this

⁵ For 9 studies it was not possible to calculate either the effect size or standard error and therefore they were not included in the funnel plot.

review also fit with key developmental theories such as attachment theory (Bowlby, 1958), social learning theory (Bandura, 1977) and social-cultural theory (Vygotsky, 1978) which postulate the importance of the early relationships and social and emotional experiences in influencing development.

A key variable of interest in many of the included studies was the impact of length of institutionalisation on EF. Parental report measures all observed that earlier adoption was associated with improved functioning (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall 2011; Merz et al., 2013a; Merz et al., 2013b) and several laboratory assessments were in accordance with this finding (Colvert et al., 2011; Eigsti et al., 2011; Loman et al., 2013; Merz et al., 2013c; Tottenham et al., 2010). However some papers failed to identify this effect (Doom et al., 2014; Hostinar et al., 2012; Merz et al., 2013c). Many studies have identified that children adopted prior to 6 months are less likely to show developmental, cognitive or social problems (Gunnar, 2001; MacLean, 2003; Rutter, Beckett, Castle, Colvert, Kreppner, Mehta et al., 2007), however the relationship between length of institutionalisation and outcomes is unclear (Crockenberg, Rutter, Bakermans-Kranenburg, van IJzendoorn, Juffer, Collins et al., 2008). A review by Julian et al (2013) concluded that the majority of studies examining PI children detected a step-like effect of age of adoption on functioning and that this effect is more apparent in adolescences and for those who had experienced global deprivation. Two of the studies that failed to replicate the age of adoption effect (Doom et al., 2014; Hostinar et al., 2012) both evaluated toddlers aged 4 years or younger, therefore the lack of observed relationship in these studies might be related to participant age.

The literature on the ability for children to recover EF abilities and factors that support this is less well developed due to the lack of longitudinal research. The ERA studies have shown that PI children adopted from Romanian orphanages can demonstrate dramatic cognitive and developmental ‘catch up’ (Rutter et al., 2007; Rutter, Sonuga-Barke, Beckett, Castle, Kreppner, Kumsta et al., 2010). However, studies assessing children who have experienced a brain insult have equally suggested that younger children may ‘grow into’ their cognitive impairments and therefore discrepancies with expected performance may become more apparent with age (Anderson & Ylvisaker, 2009). With regards to EF specifically, varying degrees

of EF recovery has been observed in paediatric populations. For example good EF catch up was observed in children 7-12 years after experiencing bacterial meningitis (Anderson et al., 2004), and domain specific differential rates and levels of recovery were observed 2 years following paediatric traumatic brain injury (Anderson & Catroppa, 2005). Within the PI population Bos et al (2009) identified significant differences on one of the two measures of EF (CANTAB SWM) between children randomly allocated to remain in institutions or to move to foster care, with the foster care group performing better. However a pre-allocation EF assessment did not occur making it difficult to determine whether this result demonstrates recovery or pre-existing between group differences.

4.5 Conclusions

This review provides further evidence for the impact of environmental and social factors on EF development. Children adopted from depriving institutions may be more likely to exhibit EF difficulties, particularly if they are removed from institutions at older ages. Furthermore although there is a paucity of research currently examining EF in adopted and looked after children, the current evidence taken alongside the known impact of childhood maltreatment suggests that these populations may be at higher risk for exhibiting EF difficulties.

There are still large gaps within the literature, particularly for the adopted and LAC populations. Given that within the UK there are more LAC and adopted than PI children, this discrepancy in research needs to be addressed before conclusions can be drawn. In particular large LAC and adopted studies utilising a consistent range of well validated EF tools are necessary to understand whether these populations struggle with EF abilities compared to children who reside with their birth families. In addition due to the broad range of EF abilities it is necessary to clarify which specific EF domains are affected to enable targeted interventions. Furthermore there is a need for more longitudinal studies to understand whether EF abilities show recovery and if so the factors important to maximise this.

Clinically this systematic review highlights that children who have experienced early life disruption or maltreatment may experience more cognitive and EF difficulties.

Considering the importance of the EF in completing goal directed tasks, clinicians may find it helpful to gather information on EF when thinking about how best to support children and families. Moreover due to the difficulties in assessing EF, incorporating more than one assessment modality (e.g. parental report and standardised tests) may provide a more accurate picture of any difficulties.

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6. Appendices

6.1 Appendix 1: This presents the search terms used to identify relevant studies.

- 1) “looked after” or LAC or welfare or foster or adopt* or institutional* or abuse or neglect or maltreatment or trauma or violence
- 2) child* or CYP
- 3) executive funct*

6.2 Appendix 2: Description of standardised neuropsychological sub-tests used in studies included in this review.

The following information is extracted from either the test manual or cited paper.

CANTAB Intra-Extra Dimensional Set Shift (IED) (Cambridge Cognition) –

This is a computerised analogue of the Wisconsin Card Sorting test that assesses rule acquisition and reversal. Participants must figure out a pattern to enable them to predict the next correct answer in the series. This underlying pattern changes a number of times and the participant must adjust their predictions in accordance with this.

CANTAB Stockings of Cambridge (SOC) (Cambridge Cognition) – This is a planning task akin to the Tower of London task. Participants observe two displays of coloured ‘balls’ hanging within ‘stockings’ or ‘socks’. The participant must move the balls in the lower half of the screen to make the pattern match that of the top half of the screen,

CANTAB Spatial Working Memory (SWM) (Cambridge Cognition) – This task requires the retention and manipulation of visuospatial information. Participants are presented with an increasing number of coloured boxes, within these they must find a blue token whilst holding in mind the rule that the token will never return to the same box twice in each trial.

CANTAB Spatial Span (SSP) (Cambridge Cognition) – This is a visuospatial analogue of the Digit Span test that assesses working memory capacity. The participant is presented with a screen of white boxes, some of which briefly change colour. Participant must replicate the pattern observed by touching the boxes in the same order.

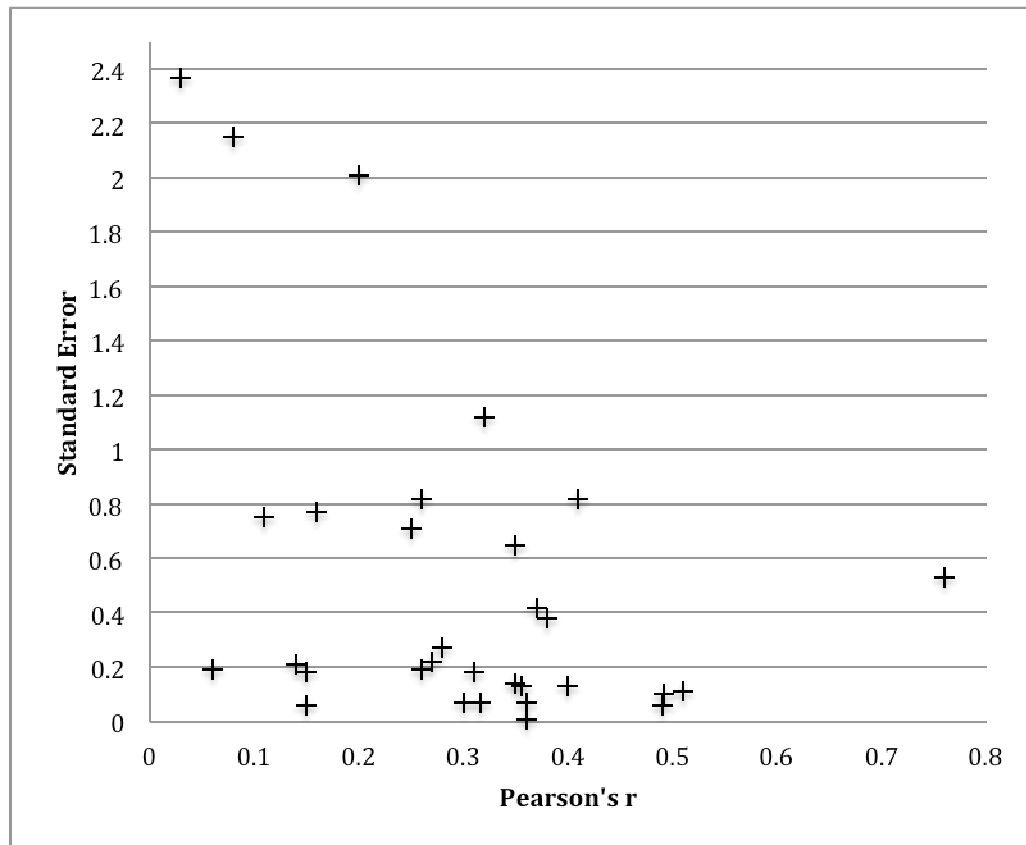
NEPSY auditory attention task (Korkman et al., 1998)– This test is designed to assess selective attention and the ability to sustain it. The participant listens to a list of words and must touch the appropriate circle in the stimulus book when he or she hears a target word.

NEUROPSI Attention and Memory Battery (Ostrosky-Solís et al., 2007) – This is a standardised battery validated for use with Spanish speakers. It assesses the following domains: orientation, attention and concentration, executive functions, working memory, immediate visual memory, and delayed visual memory. The executive functioning domain assesses the following processes: concept formation, flexibility, inhibition, and motor programming.

WISC-III reverse digit span test (WISC-III, Wechsler, 1991) – This is a measure of working memory. Participants must register an auditory stimulus (numbers) and manipulate them (reverse them) prior to their recall. The trials gradually increase in number of items presented.

6.3 Appendix 3: Displays a funnel plot showing the effect sizes for difference in EF functioning tasks between the target and control populations.

A slight skew to the left of the scale for be detected suggesting missing studies reporting larger effect sizes.



Main research project

DO CHILDREN ADOPTED FROM
BRITISH FOSTER CARE SHOW
DIFFICULTIES IN EXECUTIVE
FUNCTIONING AND SOCIAL
COMMUNICATION?

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Abstract

Background

Over the last five years the UK government has strived to reduce the age of adoption and to increase adoption rates. Although adoption is generally associated with positive outcomes, a number of placements disrupt or continue in the context of on-going difficulties. Early life experiences have an important impact on a child's emotional, social and cognitive development. Studies of children adopted from psychosocially depriving institutions have found difficulties in executive functioning and social communication ability, however it is unclear whether a similar pattern is observed in children adopted from foster care.

Objectives

This study aims to clarify whether UK adoptees show executive functioning or social communication deficits. It will explore whether these abilities are related to pre-adoption variables, particularly focusing on the effects of age of adoption and reported history of maltreatment. Finally this study will examine whether these abilities show 'recovery' following adoption and if so whether this is affected by age of adoption.

Methods

30 UK adoptees aged 7-11 years completed an assessment of their intellectual and executive functioning abilities using the WASI-II and sub-tests from the CANTAB. Adoptive parents completed questionnaires assessing their child's mental health, executive functioning and social communication traits (using the DAWBA, BRIEF and SCQ).

Findings

A statistically significant reduction in executive functioning performance compared to normative data was observed on two of three CANTAB tasks and parental report. This was in the context of preserved overall cognitive ability. A strong negative correlation was observed between age of adoption and BRIEF scores when ADHD was controlled for. No other pre or post adoption variables strongly correlated with executive functioning performance. All children scored below the recommended

SCQ cut-off, and a moderate positive correlation was observed with age of adoption. Elevated reports of emotional and behavioural difficulties were found.

Conclusions

The identification of raised mental health concerns and executive functioning difficulties is in line with the current limited research base. However, the correlation between BRIEF scores and age of adoption was contrary to a number of post-institutionalised studies. Limitations and implications for future research are discussed.

1. Introduction

1.1 Adoption in the UK

In England there were 68,840 children placed in care at the end of March 2014, most of whom (62%) became known to social services due to experiences of abuse or neglect (Office for National Statistics (ONS), 2014). The number of children residing in care in England has shown a steady increase over the past 5 years. Although the aim of reunification with the birth family tends to be the preferred outcome (Boddy, 2013), studies have identified that up to two-thirds of maltreated children who return home may be removed into care once more (Biehal, Wade, Farrelly & Sinclair, 2011; Farmer & Lutman, 2012). There is broad agreement that children have a number of changeable needs (such as stability and warmth), which are key to help a child flourish. It has been proposed that for many children their needs would be best met through adoption (Department of Education (DfE), 2012). Pre-adoptive factors such as the age of adoption and previous experiences in foster care have been linked to more post-adoption difficulties (Selwyn, Sturgess, Quinton & Baxter, 2006; Simmel, Brooks, Barth & Hinshaw, 2001). In line with this, over the last few years there has been a government supported drive to increase adoption rates and reduced the average age of adoption (as outlined in the DfE *An Action Plan for Adoption: Tackling Delay*, 2012). This drive has been demonstrated in national statistics showing that between the 31st March 2013 and 31st March 2014, 5050 children were adopted; a rate that was 26% higher than the preceding year and 58% higher than seen in 2010. Furthermore the average age of adoption has fallen from 3 years 11 months in 2010 to 3 years 5 months in 2014 (ONS, 2014).

Although adoption is generally associated with positive outcomes for both adopted children and adoptive parents (Fisher, 2003; Rushton, 2007; Rutter, Bishop, Pine, Scott, Stevenson, Taylor et al., 2011), sadly in the UK between 2 and 24% of adoptions are likely to breakdown (Beckett, Pinchen & McKeigue, 2014; Biehal, Ellison, Baker & Sinclair, 2010; Fratter, Rowe, Sapsford, & Thoburn, 1991; Rushton & Dance, 2006; Selwyn et al., 2006; Thoburn, Norford, & Rashid, 2000; Triseliotis, 2002). The large variation in reported adoption disruption rates reflects the different samples monitored (e.g. age and different level of needs) as well as inconsistencies in

the definition of a breakdown (e.g. separating or combining pre and post adoption breakdown figures). Of the families where a disruption does not occur, a quarter to a third may report on-going placement difficulties (e.g. Rushton & Dance, 2006; Selwyn, Wijedasa & Meakings, 2014).

Several studies and reviews have attempted to identify factors that influence the likelihood of a placement breakdown occurring (Biehal et al., 2010; Coakly & Berrick, 2008; Evan B. Donaldson Institute, 2004; Rushton, 2004). Factors explored have included those relating to the child, family and the post-adoption systems. Age of adoption appears to be one of the strongest predictors of placement breakdown (Biehal et al., 2010; Coakly & Berrick, 2008; Selwyn et al., 2014). A recent research report published by Selwyn et al (2014) identified three predictors of adoption breakdown: child's age, age at placement and time between adoptive placement and order. Of these, the child's age was identified as the biggest predictor of adoption breakdown with adolescents (aged 11-16 years) being identified as ten times more likely to have a disruption compared to children below the age of four years. In addition, risk of adoption disruption increased with age adopted, with children adopted before 12 months being the least likely to experience an adoption breakdown and those adopted after 4 years being at highest risk. Finally they found that children who waited more than two years for an adoption order to be granted were 1.5 times more likely to have placement breakdowns compared with those whose order was finalised within a year of placement. Post-adoption services appear to be vital in minimising disruptions and maximising stability (Evan B. Donaldson Institute, 2004).

1.2 Do adopted children experience difficulties?

1.2.1 Emotional and behavioural difficulties

Studies have shown that looked after, internationally adopted, and domestically adopted children have an increased likelihood of developing behavioural disorders (Biehal et al, 2010; Ford, Vostanis, Meltzer, & Goodman, 2007; Garland, Hough, McCabe, Yeh, Wood & Aarons, 2001; Hodges, 2008; Howe, 1997; Lawrence, Carlson & Egeland, 2006; Selwyn et al., 2014). Biehal et al (2010) identified that

38% of a sample of UK adoptees displayed clinically significant difficulties as measured by the Strengths and Difficulties Questionnaire (SDQ, Goodman, 1997). The most frequently reported difficulties being related to behaviour, hyperactivity and peer relationships. Age of adoptive placement was found to relate to the severity of difficulties, with children placed prior to 3 years displaying less serious difficulties. In addition Selwyn et al (2014) identified that children who stayed in adoptive placements scored significantly better on the SDQ behaviour index than those whose placement broke down. However Howe (1997) identified that an increase in behavioural problems was only found for children adopted later and in the context of early adverse care.

The research on whether adoptees experience more emotional difficulties is less clear. Children who experienced an adoptive placement breakdown displayed elevated scores compared to in-placement children on the short form of the Assessment Checklist for Adolescents (ACA-SF, Tarren-Sweeney, 2014). This checklist measures emotional, behavioural and inter-personal difficulties however it does not specifically assess mental health. On the ACA-SF a significant effect was observed for the following domains: non-reciprocal behaviour, social instability and dissociation/trauma (Selwyn et al., 2014). An increased likelihood of accessing mental health services has been observed for adopted children (Harwood, Feng & Yu, 2013; Miller, Fan, Grotevant, Christensen, Coyl & van Dulmen, 2000; Tan & Marn, 2013). But Miller et al (2000) and Warren (1992) noted that after controlling for level of difficulties, adopted children were twice as likely to attend Child and Adolescent Mental Health Services (CAMHS) than non-adopted children, suggesting that the increased likelihood of CAMHS attendance might relate to a referral bias as opposed to necessarily an increased rate of mental health problems. Van IJzendoorn and colleagues have completed a number of meta-analyses examining aspects of the emotional state of adoptees. They identified that children adopted after 12 months of age had less secure attachments compared to non-adopted children, however differences were not observed for children adopted prior to 12 months⁶. Domestically adopted children also displayed less disorganised attachment than post-

⁶ Parts of this analysis amalgamated both domestically and internationally adopted studies. This might make interpretation of findings more difficult given the potential for these populations to differ in early life experiences and later functioning.

institutionalised children (van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009). Additionally a meta-analysis of domestically and internationally adopted children found no differences in self-esteem between adopted and non-adopted children (Juffer & van IJzendoorn, 2007).

1.2.2 Cognitive difficulties

Although research focusing on domestically adopted children's cognitive functioning is limited, over the last 20 years there has been a surge in the number of studies and reviews examining the impact of childhood maltreatment or early life stress on cognitive functioning. As noted in section 1.1 the vast majority of children removed from biological families and placed for adoption are likely to have experienced maltreatment and early life stress, therefore this literature will be briefly discussed. Studies of maltreatment or early life stress have suggested a wide range of cognitive deficits on measures of: IQ, memory, working memory, executive functioning and attention (Carrey, Butter, Persinger & Bialik, 1995; Hart & Rubia, 2012; Nolin & Ethier, 2007; Pechtel & Pizzagalli, 2011). In addition neurobiological studies have shown evidence that extreme stress during developmentally sensitive periods can lead to profound and lasting neurobiological changes (Anda, Felitti, Bremner, Walker, Whitfield, Perry, et al., 2006; Chugani, Behen, Muzik, Juhász, Nagy & Chugani, 2001; Hanson, Adluru, Chung, Alexander, Davidson & Pollak, 2013; Hart & Rubia, 2012). A meta-analysis conducted by Van IJzendoorn, Juffer, & Poelhuis (2005) collated information regarding IQ and school functioning for internationally and domestically adopted children, these populations were analysed together. They identified that adopted children showed higher IQ scores than non-adopted siblings and peers who remained in the pre-adoption environment, and significant differences were not observed for siblings or peers within the same current environment. Furthermore IQ differences were not observed between children adopted pre and post 12 months of age. Adopted children were found to perform academically better than non-adopted siblings and peers who remained in the pre-adoption environment, but poorer than children within the same current environment. This effect appeared to be related to the age of adoption with only children adopted after 12 months showing an academic delay.

1.2.3 Social and peer difficulties

Whether adopted children display peer or social difficulties has been less widely studied. Parenting in early life has been shown to predict children's empathy, social competence and social engagement (Brody, McBride, Kim & Brown, 2002; Cheng, Dong & Zhou, 1997; Landry, Smith, Swank, & Guttentag, 2008; Lengua, Honorado & Bush, 2007; Zhou, Eisenberg, Losoya, Fabes, Reiser, Guthrie et al., 2002). Additionally later peer rejection has been associated with behavioural problems and aggression towards peers (Crick, Ostry, Burr, Cullerton, Jansen & Ralston, 2006). In accordance with this a study of internationally adopted children found that children identified as peer rejected or controversial had higher externalising scores on parent and teacher report measures (Juffer, Stams & van IJzendoorn, 2004). Sharma, McGue and Benson (1996) found that adoptive adolescents reported higher levels of pro-social behaviour, however reports from others were not gained to corroborate this behaviour. Recently Elam and colleagues (2014) suggested that an 'evocative genotype-environment association' exists between adopted children's social behaviours and adoptive parents' hostility. They identified that birth mothers low behavioural motivation predicted adopted toddler's low social motivation. Low social motivation in toddlers appeared to in turn impact on adoptive parents' hostility, which predicted later reports of disruptive peer behaviour.

1.3 Executive Functioning

A cognitive area that has become of increasing interest within the field of child maltreatment is executive functioning. Executive functioning is an umbrella term which encompasses a wide range of cognitive processes that govern purposeful goal-directed behaviour and how we respond to novel situations (Hughes, 2011). The executive functions have been implicated in playing a pertinent role in several aspects of a child's social and academic development for example the development of pragmatic skills (Blain-Briere, Bouchard & Bigras, 2014) and academic development, performance and learning (Bull, Espy, & Wiebe 2008; Cartwright, 2012; Gathercole, Pickering, Knight, & Stegmann, 2004). These executive functioning processes include "*anticipation, goal selection, planning, initiation of activity, self-regulation, mental flexibility, deployment of attention, and utilization of*

feedback.” (Anderson, 2002, p71). These skills appear to emerge at different stages from infancy to early adulthood along differing developmental trajectories (Best & Miller, 2010; Blakemore & Choudhury, 2006; Carlson, 2005; Cuevas & Bell, 2010; Dawson & Guare, 2010; Garon, Bryson, & Smith, 2008; Hoehl, Reid, Mooney & Striano, 2008; Hughes, 2011).

A handful of studies have assessed executive functioning in domestically adopted children. Leve et al (2013) identified positive associations between adopted toddler’s effortful attention with language development, birth mother verbal IQ and gender (female). Additionally, delay of gratification was positively associated with language development and gender (female). A history of placement instability has been suggested to impact inhibitory control performance when controlling for age and working memory performance (Lewis, Dozier, Ackerman, & Sepulveda-Kozakowski, 2007). Mueller et al (2012) examined the impact of monetary incentives on prosaccade and antisaccade tasks for adopted children and non-adopted controls. They identified that adopted children failed to show an improvement in performance on antisaccade trials that were incentivised. As this effect was not observed for incentivised prosaccade trials they concluded that this diminished reward sensitivity related to underlying inhibitory control deficiencies as opposed to a reduced attention capacity. In addition a group of children adopted before the age of 6 months were identified to display significantly better performance on executive functioning tasks compared to children adopted from psycho-socially depriving institutions (Beckett et al., 2010; Colvert, Rutter, Kreppner, Beckett, Castle, Groothues, Sonuga-Barke et al., 2008). However these studies did not include a non-adopted control group or comparisons to normative data therefore it is difficult to draw conclusions about how adopted children compare on these executive functioning tasks to non-adopted peers.

A much larger research base exists assessing the executive functioning of children adopted from psycho-socially depriving institutions. Studies employing the Behaviour Rating Inventory of Executive Functioning (BRIEF, Gioia, Isquith, Guy & Kenworthy, 2000) for children over 5 years of age have consistently identified above average executive functioning difficulties in this population (Groza, Ryan, & Thomas, 2008; Merz & McCall, 2011; Merz, McCall & Groza, 2013). Furthermore

reported executive functioning appears to be associated with duration of institutionalisation, with later adoption being linked to poorer abilities. There has been more variability in findings utilising laboratory or experimental tasks to assess executive functioning. Post-institutionalised children have shown reduced performance on tasks assessing: rule acquisition and manipulation (Bauer, Hanson, Pierson, Davidson & Pollak, 2009; Hanson et al., 2013; Pollak, Nelson, Schlaak, Roeber, Wewerka, Wiik et al., 2010), the retention and manipulation of spatial information (Bauer et al., 2009; Bos, Fox, Zeanah & Nelson, 2009; Hanson et al., 2013; Pollak et al., 2010), spatial span (Merz et al., 2013), inhibition (Cardona, Manes, Escobar, Lopez & Ibanez, 2012; Colvert et al., 2008; Eigsti, Weitzman, Schuh, de Marchena & Casey, 2011; Loman, Johnson, Westerlund, Pollak, Nelson & Gunnar, 2013; McDermott, Westerlund, Zeanah, Nelson & Fox, 2012), and selective and sustained auditory attention (Eigsti et al., 2011). Studies looking at planning abilities have been more inconstant with some suggesting difficulties (Bauer et al., 2009; Hanson et al., 2013) and others reporting no significant differences between post-institutionalised and non-adopted controls (Bos et al., 2009; Pollak et al., 2010).

1.4 Executive functioning and social communication skills

The term ‘social communication skills’ covers a range of socially directed behaviours including the ability to: initiate and maintain conversations, request information from others, listen to and respond to others, and appropriately interact in games or activities (Carter, Ornstein-Davis, Klin, & Volkmar, 2005). Social communication deficits make up one third of the triad of impairments commonly observed in individuals with Autistic Spectrum Disorders (ASD). However social communication deficits are also frequently seen in individuals who do not meet the criteria for ASD for example: individuals with psychosis (Dickinson, Bellack & Gold, 2007), following a traumatic brain injury (Coelho, Liles & Duffy, 1991; Dahlberg, Cusick, Hawley, Newman, Morey, Harrison-Felix et al., 2007; Marsh & Knight, 1991; McDonald & Flanagan, 2004), children with ADHD (Nijmeijer, Minderaa, Buitelaar, Mulligan, Hartman & Hoekstra, 2008; Nixon, 2001), and children with behaviour problems (Donno, Parker, Gilmour & Skuse, 2010; Gilmour, Hill, Place & Skuse, 2004).

As noted in section 1.2.3 it is unclear whether domestically adopted children demonstrate elevated rates of peer and social communication difficulties. However, a number of studies have identified social communication deficits and ‘quasi-autistic’ traits (Rutter, Anderson-Wood, Beckett, Bredenkamp, Castle, Groothues et al., 1999) in children adopted from socially depriving institutions. The term quasi-autistic traits was used as these children displayed “*a significantly greater degree of improvement between ages 4 and 6 years... unusual spontaneity and flexibility of communication... and an unusual degree of social approach*” (Rutter, Kreppner, Croft, Murin, Colvert, Beckett, Sonuga-Barke et al., 2007c, p1205). Colvert et al (2008) identified that 14% of a sample of Romanian orphans who were adopted after the age of 6 months displayed quasi-autistic traits, and interestingly longitudinal studies demonstrated that for many these quasi-autistic traits display some amelioration over time (Rutter et al., 2007c). In comparison none of a sample of children adopted from the UK prior to 6 months of age displayed quasi-autistic traits (Colvert et al., 2008). It is however unclear whether the lack of identified social communication difficulties in domestically adopted children was influenced by the earlier age of adoption.

In the aforementioned study conducted by Colvert and colleagues children who displayed quasi-autistic traits performed statistically significantly poorer on both a measure of executive functioning and theory of mind, suggesting that these abilities may play a mediating role in the quasi-autistic traits. The topic of theory of mind has been the most extensively researched in relation to executive functioning and associations between executive functioning and theory of mind abilities have been observed in both typically developing children and children with a range of clinical diagnoses including: autism, hyperactivity, conduct problems, traumatic brain injuries and foetal alcohol syndrome (Colvert et al., 2008; Hughes, 2011). Furthermore although executive functioning has been implicated more broadly in both ASD and aspects of social communication and interaction (Hill, 2004; McEvoy et al., 1993), the nature of the relationship remains unclear.

1.5 The current study

Given the likely importance of executive functioning and social communication on a child's social, emotional and academic development, this study will examine whether these are areas that adopted children display difficulties and consequently where adopted children and families might benefit from additional support. To date the majority of research on executive functioning and social communication ability in adopted children has focused on children adopted from non-UK psychosocially depriving institutions, which lack in consistent, responsive caregivers. Theoretically children adopted from foster care should have experienced less psychosocial deprivation, and possibly more active maltreatment, this may result in a different neuropsychological profile of strengths and weaknesses. As described previously, the few studies that have compared domestically adopted and post-institutionalised children have found less difficulties for the domestically adopted sample. However these studies have selected children adopted at a young age, typically prior to 6 months (e.g. Colvert et al, 2008; Pollak et al, 2010). In both the post-institutionalised and adoptive research younger age of adoption has been associated with fewer difficulties in a range of areas. Therefore the difference in scores between the post-institutionalised and adopted children could represent an age of adoption effect rather than a genuine lack of difficulties existing. Furthermore, as the average age of adoption is 3 years 5 months (DfE, 2014) the current research findings may not generalise well to the majority of the UK adopted population and may in fact underestimate the levels of difficulties experienced in this population.

The current study will address some of the aforementioned gaps in the domestically adopted literature. Specifically the objectives of this study are;

- 1) To clarify whether UK adoptees show executive functioning deficits akin to those observed in post-institutionalised children.
- 2) To examine whether executive functioning performance correlates with social communication traits.
- 3) To consider whether pre-adoption maltreatment related variables are linked with differences in executive functioning and social communication abilities.

4) To investigate whether executive functioning and social communication scores show 'recovery' following adoption.

2. Methods

2.1 Study Overview

2.1.1 Study Design

This study utilised a cross sectional design to observe the cognitive profile of a sample of domestically adopted UK children at a single point in time. The outcome variables of interest were executive functioning ability and social communication traits. Time since adoption, age of adoption and reported history of maltreatment were hypothesised to be potential predictor variables. In addition an overview of cognitive ability, mental health and ADHD symptoms were ascertained to control for these potentially confounding variables.

2.1.2 Power Analysis

A power analysis was computed through the G power program (Erdfelder, Faul, & Buchner, 1996) focusing on the primary hypothesis. This identified that 27 participants would be needed to discover a medium effect size of $d = 0.5$, with the probability of making a type one error being 0.05 and power being 0.80. A medium effect size was selected based on the current literature, for example Colvert et al (2008) discovered a medium to large effect ($\eta^2 = 0.12$) when comparing Executive functioning in Romanian orphans compared to control groups. In total 31 participants were recruited to take part in this study.

2.2 Participants

2.2.1 Recruitment

Participants opted into this study following reading the research advert (see appendix 1) which was published alongside an advertorial in the Adoption UK magazine. In addition adoption agencies linked with the Consortium of Voluntary Adoption Agencies (CVAA) circulated this advert via email. A total of 48 potential participants were identified through families enquiring about the study. Of these 48 participants three were excluded due to being outside of the study age range, 31 of the 45 potential participants (69%) completed the research assessment. Reasons for not taking part in the study included: travelling to the assessment being too difficult,

expensive or far, the child not wishing to take part in the research and parents not responding to follow up emails about the study. Of the 31 participants who completed the research assessment one was excluded from the analysis due to their IQ being assessed to be in the impaired range on the WASI-II (<70).

2.2.2 Inclusion and Exclusion Criteria

This study included children aged 7-11 years who were adopted from foster care within Britain. To be included in the study both the children and adoptive parents had to be proficient in English to a level where they could complete the assessment without an interpreter. Participants were excluded if they had a sensory impairment likely to significantly impede their performance on neuropsychological assessments (e.g. formally registered as deaf or blind). In addition children with a formal diagnosis of Autistic Spectrum Disorder (ASD) or a global learning disability were not included in the study.

2.2.3 Demographic information

Of the sample of 30 children included in the analysis, 60% (n=18) were male (mean age = 9.06 years, range 7 to 11.92 years). The majority of participants were classified ethnically as White British (80%, n = 24). Of the remaining 20%, 6.7% (n = 2) were classified as Black British, 6.7% (n = 2) as White Asian, 3.3% (n = 1) as Mixed African/European and 3.3% (n = 1) as Mixed Indian/White British. The mean length of time since the adoption order was granted was 5.4 years (range 1 to 9.4 years).

Figure 1- Demographics of the study sample

| | Sample (n = 30) |
|--------------------------------------|-----------------|
| Age in months (SD) | 108.80 (16.13) |
| Ethnicity % (n) | |
| <i>White British</i> | 80% (24) |
| <i>Black British</i> | 6.67% (2) |
| <i>White Asian</i> | 6.67% (2) |
| <i>Mixed African/European</i> | 3.33% (1) |
| <i>Mixed Indian/White British</i> | 3.33% (1) |
| Gender % (n) | |
| <i>Male</i> | 60% (18) |
| <i>Female</i> | 40% (12) |
| Age left birth family in months (SD) | 18.70 (19.78) |

| | |
|--|---------------|
| Age adoption order granted in months (SD) | 46.97 (23.43) |
| Time since adoption order granted in months (SD) | 64.23 (25.32) |
| Reported experience of abuse (%) | 24 (80%)* |

*n = 27, 3 adoptive parents did not know this information.

2.3 Assessment Measures

2.3.1 Mental health screening

For each participant one adoptive parent was asked to complete the online parental interview for the Development and Well-Being Assessment (DAWBA; Goodman, Ford, Richards, Gatward & Meltzer, 2000) within 1 month prior to the research assessment date. The DAWBA was used as a screen for psychiatric symptoms and associated functional impairments. Due to the potential for ADHD difficulties to produce false positives on measures of executive functioning (Hughes and Graham, 2002), the DAWBA was additionally employed to measure and extract ADHD symptoms, enabling this to be controlled for in the analysis. The DAWBA has been used extensively both clinically and in research (e.g. Ford, Vostanis, Meltzer, & Goodman, 2007; Meltzer, Gatward, Goodman & Ford, 2000; Meltzer, Gatward, Corbin, Goodman & Ford, 2003). It has demonstrated strong validity in differentiating clinical and non-clinical samples (Fleitlich-Bilyk & Goodman, 2004; Goodman et al, 2000) and accuracy in predicting mental health conditions (e.g. Fleitlich-Bilyk & Goodman, 2004; Foreman et al., 2009; Goodman et al., 2000). The Strength and Difficulties Questionnaire (Goodman, 1997) and the likelihood of specific diagnoses were extracted from the DAWBA to quantify emotional and behavioural difficulties. The SDQ provides a score of total emotional and behaviour problems ('abnormal' cut-off ≥ 17) as well as a report of the following sub-scales; emotional problems (cut-off ≥ 5), behavioural problems (cut-off ≥ 4), hyperactivity (cut-off ≥ 7), peer problems (cut-off ≥ 4) and pro-social behaviour (cut-off ≤ 4) (see Goodman, 2001 for a description of psychometric properties of the SDQ).

2.3.2 General cognitive ability

The second version of the Wechsler Abbreviated Scale of Intelligence (WASI-II; Wechsler, 2011) was administered to gather an overview of cognitive ability and IQ.

The WASI-II consists of 4 sub-tests, which measure crystallised abilities, non-verbal fluid abilities and visuomotor/coordination skills. The WASI-II enabled IQ to be controlled for in the analysis as well as identifying children presenting with significant impairments of intellectual functioning to be excluded from the analysis. The WASI-II has been standardised on a large sample of children and has demonstrated concurrent validity with longer assessments of IQ (Wechsler, 2011). In addition the WASI-II is reported to demonstrate acceptable to excellent test-retest stability with children (.79-.90) and excellent inter-rater reliability (.94-.99) (Wechsler, 2011).

2.3.3 Executive functioning

It has been suggested that laboratory and report measures should be used in combination to assess executive functioning as they may capture slightly different aspects of functioning (e.g. cognitive versus related emotional and social elements), and functioning in differing environmental situations (Goldstein & Naglieri, 2013). As a result, executive functioning was measured via both parental report and a laboratory assessment.

One parent was asked to complete the Behavior Rating Inventory of Executive Functioning (BRIEF; Gioia et al., 2000). The BRIEF produces three scales: the Global Executive composite (GEC), Behavioural Regulation (BRI) and Metacognition (MI). It has demonstrated high internal consistency (Cronbach α scores between .80-.98) and confirmatory factor analyses have supported the validity of the BRIEF as a measure of executive functioning consistent with theoretical models of executive functioning (Gioia, et al., 2000; Gioia, Isquith, Retzlaff & Espy, 2002; Gioia, Kenworthy & Isquith, 2010). Additionally, the BRIEF has been hypothesised to be a more ecologically valid measure of executive functioning (Gioia and Isquith, 2004).

Participants completed four sub-tests from the Cambridge Neuropsychological Test Automated Battery (CANTAB, Cambridge Cognition); Paired Associate Learning (PAL), Spatial Working Memory (SWM), Stocking of Cambridge (SOC), and Intra-Extra Dimensional Shift (IED). These sub-tests were selected as performance

difficulties have been observed on these tests for children adopted from socially depriving institutions (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Merz et al., 2013; Pollak et al., 2010). The four sub-tests selected are hypothesised to measure visual memory and executive functioning. The CANTAB has been well validated for use with children of this age range and high internal consistency coefficients were reported (.73-.95) (Luciana and Nelson, 2002), however Syväoja, Tammelin, Ahonen, Räsänen, Tolvanen, Kankaanpää & Kantomaa (2014) reported the individual sub-tests to range from unreliable and inconsistent to acceptable and moderately-good level of reliability. A range of studies have demonstrated the construct and discriminant validity for children (see Henry & Bettenay, 2010).

2.3.4 Social communication traits

Social communication traits were assessed via parental report, one parent was asked to complete the Social Communication Questionnaire – current version (SCQ; Rutter, Bailey & Lord, 2003). On the SCQ the recommended cut-off for further ASD screening is >15 (Rutter et al., 2003). The SCQ has shown good discriminative validity between ASD and other non-Autistic disorders in children over the age of 4 years (Berument, Rutter, Lord, Pickles & Bailey, 1999; Chandler, Charman, Baird, Simonoff, Loucas, Meldrum et al., 2007). Correlations with longer ASD assessment tools such as the Autism Diagnostic Interview- Revised (ADI-R; Rutter, Le Couteur & Lord, 2005) have been found between .50 and .71 (Berument et al., 1999; Hanson et al., 2002).

2.3.5 Demographic variables

Demographic data was collected using questions extracted from a questionnaire developed in partnership with Adoption UK service users, they reported this questionnaire to be well tolerated and appropriate for use with adopted parents (see appendix 2). The demographic questionnaire gathered information on variables that might have influenced performance on the cognitive, emotional and social assessment measures, enabling these to be included in the analysis. For example: age the child left the birth family, age of adoption, time since adoption, and reported history of abuse.

2.4 Procedure

Following gathering ethical consent from both the parent and child the face-to-face assessment was conducted with either the primary researcher or a research assistant trained in administering the measures. The assessment took approximately 2 hours and allowed time for at least one break, parents were asked to remain in the waiting area to decrease potential distractions. All assessments were conducted at either the IoPPN campus or a nearby NHS children's outpatient centre. To reduce the effects of fatigue the CANTAB and WASI-II were counter-balanced in their order of administration, with half of the participants completing the CANTAB first and the other half beginning with the WASI-II. Whilst the assessment was occurring one parent was asked to complete the SCQ, demographic questionnaire and the BRIEF, the DAWBA access codes were sent prior to the assessment once the family had opted in to the study.

2.4.1 Piloting

An initial pilot was conducted with the first participant to identify any problems with the procedure and measures. In this assessment a fifth sub-test from the CANTAB was administered (Delayed Match to Sample, DMS). Following this pilot it was felt that the assessment was too long for the younger participants. Hence the DMS CANTAB sub-test was removed from the procedure to decrease the effects of fatigue, this sub-test was selected to be removed as it had been used less in previous literature and it predominantly measured sustained attention which could be ascertained through the parental report measures as well as clinical observation. No further concerns were noted.

2.5 Ethical issues

2.5.1 Ethical approval

Ethical approval was sought and granted from King's College London Research Ethics Committee (reference number PNM/13/14-117, see appendix 3). Following

approval a minor modification was requested and permitted to broaden the number of Adoption agencies that recruitment could occur through (see appendix 4).

2.5.2 Informed consent

Prior to the assessment two information sheets were sent to the families, one for the parents and an age appropriate version for the child (see appendices 5 and 6), these briefly described the research and the layout of the assessment. Parents were encouraged to ask any questions about the information sheets either via email or to arrange a time to discuss the research further. At the assessment families were given a brief overview of the assessment and time to ask any further questions. Following this, informed consent was gained from both the parents and the child (see appendices 7 and 8). It was reiterated to the families that they were free to terminate the assessment at any point and to withdraw from the study without any repercussions.

2.5.3 Feedback

Feedback was provided in the form of a personalised summary of their child's performance on the CANTAB, the WASI-II as well as an overview of their DAWBA scores (see appendix 9 for an example research summary). This report was sent to families within one month of the research assessment and following the return of all completed parental report measures.

2.5.4 Data protection

The requirements of the Data Protection Act were complied with throughout the study. Participants were allocated ID numbers and where possible data was anonymised. Data was stored in a locked filing cupboard and was not removed from the IoPPN campus. Any potentially identifiable computer data was kept in password-protected documents and stored on a password-protected USB drive.

2.6 Data analysis plan

The collected data was coded and entered into a database using IBM SPSS Statistics 22, all parts of the analysis was conducted using this program. To reduce the need for multiple analyses it was planned that a composite executive functioning score would be calculated including both the CANTAB executive functioning sub-tests and the overall BRIEF score. However, due to the small correlations between the CANTAB sub-tests and the BRIEF this composite was not created. To complete the primary objective of the study and assess whether children adopted from UK foster care showed executive functioning deficits compared to normative data, one-sample t-tests were run between executive functioning measures and normative data. For the second objective bivariate correlations were run to look for a relationship between SCQ and executive functioning scores. To complete the third objective bivariate correlations were used to determine the impact of pre-adoption maltreatment related variables on outcome measures. Partial correlations were also used to control for variables identified as potentially influencing outcome measures (ADHD symptoms and gender). Furthermore, independent samples t-tests were used to identify statistically significant within group differences related to history of maltreatment. With regards to the final aim bivariate correlations were used to determine the impact of time since adoption on outcome measures, partial correlations were also used to control for variables identified as potentially influencing outcome measures (ADHD symptoms and gender).

3. Results

3.1 Participant characteristics

3.1.1 Mental health screen

The SDQ was extracted from the parent completed DAWBA data to gain an overview of the emotional and behavioural functioning of the included participants. This adopted sample demonstrated more difficulties on all SDQ scales compared to the national norms⁷. This difference reached statistical significance for the following scales: emotional symptoms, conduct problems, hyperactivity, prosocial, total difficulties and impact. Effect sizes (ES) were calculated using the mean, standard deviation and participant numbers for the research group and normative data. The calculated ES ranged from $r=.12$ (small) to $r=.80$ (large) (see figure 2). Independent samples t-tests revealed no statistically significant differences between male and female participants on any of the SDQ scales.

Figure 2 - The SDQ data for the adopted sample compared to normative data.

| | Adopted sample (n=30) | | National norms (n=10298) | | Difference | ES (r) |
|----------------------|--------------------------|-----|-----------------------------|-----|------------|--------|
| SDQ scale | Mean | SD | Mean | SD | | |
| Emotional symptoms* | 3.2 | 2.7 | 1.9 | 2.0 | $p=.015$ | .31 |
| Conduct problems** | 3.3 | 2.3 | 1.6 | 1.7 | $P<.001$ | .45 |
| Hyperactivity** | 6.6 | 3.4 | 3.5 | 2.6 | $p<.001$ | .51 |
| Peer problems | 1.9 | 2.2 | 1.5 | 1.7 | $p=.299$ | .12 |
| Prosocial scale* | 7.5 | 2.5 | 8.6 | 1.6 | $P<.017$ | .32 |
| Total difficulties** | 15.1 | 7.9 | 8.4 | 5.8 | $p<.001$ | .50 |
| Impact score** | 3.3 | 2.8 | 0.4 | 1.1 | $p<.001$ | .80 |

National norms for children aged 5-15 years are drawn from Meltzer et al., 2000

* One-sample T-tests demonstrated that the adopted group performed significantly poorer than normative data ($p<.05$)

** One-sample T-tests demonstrated that the adopted group performed significantly poorer than normative data ($p<.001$)

⁷ As the age range of participants in this study fell across more than one age band on the SDQ norms the total national norms were used for comparisons.

3.1.2 Cognitive Functioning

Adopted participants scored within the average range for all WASI-II scales (see figure 3). IQ scores on the WASI-II have a mean of 100 and a standard deviation of 15. A one-sample t-test identified the mean PRI score to be statistically significantly below the norm of 100 ($t(29)=-237$, $p=.025$). No other significant differences were identified.

Figure 3 - Shows the WASI-II data for all participants compared to normative data

| WASI-II Scale ⁸ | Mean | SD | Range | Description | Difference | ES (r) |
|----------------------------|--------|-------|--------|-------------|------------|--------|
| FSIQ | 96.93 | 13.70 | 74-140 | Average | $p=.230$ | .10 |
| VCI | 100.67 | 15.30 | 68-149 | Average | $p=.813$ | .02 |
| PRI | 94.07 | 13.72 | 64-126 | Average | $p=.025$ | .19 |

3.2 Data analysis

Prior to analysis the assumption of normality was met for all assessment measures (see appendix 10 for skew and kurtosis scores), as a result no data transformations were performed.

3.2.1 Executive functioning

To test whether children adopted from UK foster care show executive functioning deficits compared to normative data one-sample t-tests were completed for all measures of executive functioning. On the BRIEF questionnaire all index scores were found to be significantly above normative values⁹: BRI ($t(29)=6.2$, $p=.000$), MI ($t(29)=5.8$, $p=.000$), and GEC ($t(29)=6.4$, $p=.000$). Medium to large effect sizes were observed ($r=.47-.51$). Additionally a statistically significant difference was observed for two of the CANTAB executive functioning sub-tests¹⁰: IED total errors adjusted ($t(29)=-2.93$, $p=.007$) and SWM between errors ($t(29)=-4.26$, $p=.000$). A difference

⁸ The normative data for all children was used in these comparison ($n=1,100$).

⁹ The total normative data for children age 5-18years was used in comparisons, this was gained from Gioia et al (2000), $n=1,419$

¹⁰ Test performance was compared to the CANTAB internal normative data and matched to age. This normative data is drawn from the results of 3000 healthy participants aged 4 to 90 years.

was not observed for the executive functioning sub-test SOC ($t(25)=-1.59$, $p=.13$) or the memory task PAL ($t(26)=.35$, $p=.73$). Small to medium effect sizes were observed ($r=.03$ - $r=.37$).

Figure 4 - The mean scores on measures of executive functioning

| | Mean | SD | Description | Difference | ES (r) |
|---|-------|-------|-------------|------------|-----------|
| BRIEF^a | | | | | |
| Behavioral Regulation Index (BRI) | 65.63 | 13.85 | Elevated | $p<.001$ | .50 |
| Metacognition Index (MI) | 63.37 | 12.64 | Average | $p<.001$ | .47 |
| Global Executive Composite (GEC) | 65.33 | 13.11 | Elevated | $p<.001$ | .51 |
| CANTAB^b | | | | | |
| IED (<i>total errors adjusted</i>) | -0.45 | 0.84 | Average | $p=.007$ | .22 |
| SOC (<i>problems solved in minimum moves</i>) | -0.29 | 0.94 | Average | $p=.125$ | .14 |
| SWM (<i>between errors</i>) | -0.79 | 1.02 | Low average | $p<.001$ | .37 |
| PAL (<i>total errors adjusted</i>) | 0.05 | 0.77 | Average | $p=.726$ | .03 |

^a The BRIEF T-scores are presented here, mean T score = 50, SD = 10.

^b CANTAB scores are presented as z-scores, mean = 0, SD = 1.

As displayed in figure 5 correlations between CANTAB executive functioning sub-tests and the BRIEF ranged from $r=.01$ to $r=.44$, and varied in direction. As a result an overall executive functioning composite was not created and analyses were performed separately on the BRIEF GEC and CANTAB executive functioning sub-tests.

Due to the known impact of ADHD on executive functioning, all executive functioning measures were correlated with the SDQ hyperactivity sub-scale and the DAWBA likelihood of meeting criteria for the diagnosis of ADHD. As figure 5 shows, the SDQ and DAWBA ADHD variables were significantly correlated with all BRIEF indices ($r=.48$ - $r=.95$). However, weak correlations were observed between measures of ADHD and all CANTAB tasks ($r=.01$ – $r=.17$). As a result ADHD will be controlled for in the BRIEF analysis but not the CANTAB analysis. As difficulties were not observed on the CANTAB memory task (PAL), this was not included in later analyses.

Figure 5 - Displays the Pearson's r correlation values for measures of ADHD and executive functioning

| | <i>ADHD DSM-IV</i> | <i>SDQ hyperacti vity scale</i> | <i>BRIEF GEC</i> | <i>BRIEF MI</i> | <i>BRIEF BRI</i> | <i>CANTAB SOC</i> | <i>CANTAB SWM</i> | <i>CANTAB IED</i> | <i>CANTAB PAL</i> |
|---|------------------------|---|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <i>ADHD DSM-IV</i> | 1 | .93** | .76** | .84** | .53** | -0.02 | -0.12 | -0.08 | -0.14 |
| <i>SDQ hyperacti vity scale</i> | .93** | 1 | .72** | .81** | .48** | 0.01 | -0.13 | 0.03 | -0.17 |
| <i>BRIEF GEC</i> | .76** | .721** | 1 | .95** | .90** | 0.06 | -0.16 | 0.01 | -0.08 |
| <i>BRIEF MI</i> | .84** | .81** | .95** | 1 | .73** | -0.04 | -0.24 | -0.02 | -0.12 |
| <i>BRIEF BRI</i> | .53** | .48** | .90** | .73** | 1 | 0.20 | -0.01 | 0.02 | -0.03 |
| <i>CANTAB SOC</i> | -0.02 | 0.01 | 0.06 | -0.04 | 0.20 | 1 | .44* | 0.24 | 0.05 |
| <i>CANTAB SWM</i> | -0.12 | -0.13 | -0.16 | -0.24 | -0.01 | .44* | 1 | 0.14 | .43* |
| <i>CANTAB IED</i> | -0.08 | 0.03 | 0.01 | -0.02 | 0.02 | 0.24 | 0.14 | 1 | 0.05 |
| <i>CANTAB PAL</i> | -0.14 | -0.17 | -0.08 | -0.12 | -0.03 | 0.00 | .431* | 0.05 | 1 |

*p<.05

**p<.01

Independent samples t-tests identified no statistically significant differences between male and female participants on the BRIEF GEC ($t(28)=.85$, $p=.403$) or any of the CANTAB executive functioning tasks (IED ($t(28)=1.15$, $p=.260$), SOC ($t(28)=-.63$, $p=.534$), SWM ($t(28)=.28$, $p=.783$), therefore gender was not controlled for in the executive functioning analysis. Additionally statistically significant correlations were not observed between FSIQ and the BRIEF GEC ($r=.19$) or any of the CANTAB executive functioning sub-tests ($r=-.04$ – $r=.29$), so this was not controlled for in later executive functioning analyses. See appendix 11 for an overview of correlations between demographic variables and assessment tools.

3.2.2 BRIEF ratings

All BRIEF correlations were performed controlling for ADHD symptoms as measured by the DAWBA. A significant correlation was not found between the BRIEF GEC and age left birth family home ($r_p = -.27$, $p = .160$) or time since adoption ($r_p = .23$, $p = .227$). Furthermore no significant correlation was observed between age of assessment and the BRIEF GEC ($r_p = -.08$, $p = .683$). A statistically significant correlation was observed between the BRIEF GEC and age adopted ($r_p = -.42$, $p = .025$), however this failed to reach statistical significance when the Bonferroni correction was manually applied to adjust for the multiple correlations.

3.2.3 CANTAB executive functioning performance

No statistically significant correlations were observed between the CANTAB IED task and age left birth family ($r = -.19$, $p = .318$), age adopted ($r = -.11$, $p = .554$) and time since adoption ($r = -.22$, $p = .245$). CANTAB IED performance did correlate with age ($r = -.40$, $p = .028$) however this did not remain significant following controlling for multiple comparisons using the Bonferroni correction.

No statistically significant correlations were observed between the CANTAB SOC sub-test and demographic variables: age ($r = -.14$, $p = .504$), age left birth family ($r = .20$, $p = .330$), age adopted ($r = .13$, $p = .514$) and time since adoption ($r = -.25$, $p = .210$).

A similar pattern was found for the CANTAB SWM sub-test, no significant correlations were observed with: age ($r = -.10$, $p = .586$), age left birth family home ($r = .19$, $p = .318$), age adopted ($r = -.18$, $p = .253$), and time since adoption ($r = -.23$, $p = .228$).

3.2.4 Social communication traits

On the SCQ none of the participants scored above the recommended cut-off for further ASD screening (mean 4.7, $SD = 3.7$, range 0-12). Controlling for ADHD, SCQ scores were found to correlate strongly with the BRIEF GEC ($r_p = -.64$, $p = .000$), with lower SCQ scores being associated with better executive functioning scores. However this effect was not replicated for any of the CANTAB executive

functioning sub-tests ($r=-.01$ – $r=.17$). In addition statistically significant between gender differences were observed on SCQ scores ($t(28)=1.68$, $p=.04$). As a result gender was controlled for in any significant correlations. FSIQ was not found to correlate with SCQ scores ($r=-.07$, $p=.714$) and therefore was not controlled for.

Figure 6 - SCQ scores separated by gender

| Gender | Mean | SD |
|---------------|------|------|
| Male (n=18) | 6.61 | 4.04 |
| Female (n=12) | 3.33 | 2.84 |

3.2.5 Predictors of SCQ scores

No significant correlations were found between SCQ scores and: age ($r=.036$, $p=.849$), time since adoption ($r=-.19$, $p=.319$) and age left birth home ($r=.22$, $p=.241$). A significant correlation was observed between age adopted and SCQ score, this effect remained when gender was controlled for ($r_p=.41$, $p=.028$). However, this effect did not remain significant following controlling for multiple comparisons using the Bonferroni correction.

3.2.6 Impact of reported history of abuse

The profiles of scores were compared across the participants reported to have experienced abuse in the biological home ($n = 24$) versus those with no known history of abuse ($n = 3$). Children without a history of abuse performed better on the two of the three CANTAB executive functioning sub-tests, BRIEF GEC, WASI-II, SDQ and SCQ (figure 7) however, none of these differences were found to be statistically significant through independent samples t-tests ($p>.05$). Medium effect sizes were observed for the SCQ and SDQ total scores.

Figure 7 - Displays the profile of scores divided into children with and without histories of abuse.

| Measure | History of abuse (n=24) | No history of abuse (n=3) | Difference | ES (r) |
|------------|----------------------------|------------------------------|------------|--------|
| CANTAB SOC | -.27 (1.03)* | -.42 (.40) | -0.15 | .07 |
| CANTAB SWM | -.72 (.99) | -.51 (.38) | .21 | .11 |
| CANTAB IED | -.42 (.76) | -.04 (1.61) | .38 | .22 |

| | | | | |
|-----------------|---------------|---------------|-------|-----|
| SCQ total score | 5.29 (3.91) | 2.00 (1.73) | -3.29 | .40 |
| BRIEF GEC | 65.54 (13.16) | 57.33 (15.63) | -8.21 | .29 |
| WASI-II FSIQ | 95.54 (11.69) | 100.00 (2.65) | 4.46 | .20 |
| SDQ total score | 15.08 (7.51) | 8.00 (6.56) | -7.08 | .43 |

* n = 21

3.2.6 Post-Hoc comparisons

Due to the above average levels of reported difficulties on the SDQ, correlations were run to assess whether these difficulties impacted on the assessments of executive functioning and social communication traits. Correlations were run between the total SDQ score with the BRIEF GEC, the CANTAB executive functioning sub-tests and the total SCQ score. No relationship was found between the total SDQ score and any of the CANTAB executive functioning sub-tests ($r = -.01$ – $r = -.14$). A strong correlation was found between the SDQ and the BRIEF GEC ($r = .67$, $p = .000$), however following controlling for ADHD this correlation changed direction and no longer remained statistically significant ($r_p = -.35$, $p = .066$). In addition a moderate correlation was found between the total SDQ and the total SCQ scores, this effect remained following controlling for gender ($r_p = .42$, $p = .02$).

4. Discussion

4.1 Summary

This study examined the executive functioning, social communication and mental health of a sample of children adopted from UK foster care. In this study the adopted sample displayed difficulties in several aspects of executive functioning as measured by both laboratory and parental report measures. A statistically significant difference in performance compared to normative data was observed on the two of the three CANTAB executive functioning tasks (SWM and IED), with participants scoring lower than the normative sample. In addition, the adopted children were rated as displaying significantly more executive functioning difficulties than normative data via parental report. These difficulties were observed in the context of preserved overall cognitive ability (measured by the WASI-II) and visual memory and learning (measured by the CANTAB PAL). None of the pre or post adoption variables significantly correlated with executive functioning performance. However, controlling for ADHD symptoms age adopted correlated strongly with the BRIEF GEC, with older age being associated with less reported difficulties. Furthermore age at assessment was strongly correlated with CANTAB IED performance.

In terms of social communication traits all participants scored below the recommended cut-off of 15 on the SCQ. Parental ratings of social communication traits and executive functioning difficulties were strongly correlated, however SCQ scores and CANTAB performance failed to display a correlation. Males were rated as displaying significantly more social communication traits, and a moderate correlation was observed between SCQ scores and age adopted, with children adopted later showing more SCQ traits even after controlling for gender.

On the SDQ, participants were reported to display statistically significantly more difficulties than the normative sample. This was observed for: emotional problems, conduct problems, hyperactivity, pro-social behaviours, total difficulties and level of impact. SDQ difficulties correlated strongly with the other parental report measures of executive functioning and social communication traits, however a correlation with CANTAB performance was not observed. Of note, all parent report measures were

found to strongly correlate (see appendix 11). This could be an indication that these areas of functioning correlate strongly or that measures are assessing common factors or even similar biases in reporting (this is discussed further in section 4.3).

80% of the sample were reported to have experienced maltreatment in the past. History of reported abuse demonstrated an impact on SDQ, SCQ, WASI-II, BRIEF and CANTAB SWM and IED performance, with better scores being observed for children without an abuse history. Although these differences were not statistically significant, medium effect sizes were observed for the SCQ and SDQ total scores, suggesting that quality of early experiences might impact on later reported social, emotional and behavioural functioning. However this analysis was limited by the small number of participants reported to either not have experienced abuse (n=3) or whose history was unknown (n=3).

4.2 Results in context of literature

4.2.1 Executive functioning performance

Currently no published studies have reported the performance of UK children adopted from foster care on either the executive functioning sub-tests of the CANTAB or the BRIEF. As a result there is not a strong existing literature base to compare these results to. However, findings of this study are in line with the two studies that suggested inhibitory control difficulties in this population (Lewis et al., 2007; Mueller et al., 2012). Additionally the results of this study were in accordance with the current literature assessing CANTAB and BRIEF performance in post-institutionalised children (e.g. Bauer et al., 2009; Bos et al., 2009; Groza et al., 2008; Hanson et al., Merz & McCall, 2011; Merz et al., 2013a; Pollak et al., 2010). This study observed a similar pattern of difficulties on the CANTAB SWM and IED tasks (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Pollak et al., 2010) alongside a lack of impairment on the SOC sub-test (Bos et al., 2009; Pollak et al., 2010). However, results for the SOC sub-test have been more variable with two studies reporting post-institutionalised children to perform poorer than non-adopted controls (Bauer et al., 2009; Hanson et al., 2013), therefore further clarification is necessary to determine whether these populations display planning difficulties. In

addition the parental reported difficulties on the BRIEF corresponded with the post-institutionalised studies described in section 1.3 (Groza et al., 2008; Merz & McCall, 2011; Merz et al., 2013a).

4.2.2 Age of adoption and influence on later development

In line with the current research age of adoption was explored as a proxy for duration of maltreatment. In the current study there was no association between the age of adoption and CANTAB performance, however a strong negative association was identified with BRIEF scores (when controlling for ADHD symptoms). This finding is largely inconsistent with the literature on post-institutionalised children where younger age of adoption has been associated with improved executive functioning performance on parental report measures (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall 2011; Merz et al., 2013a; Merz et al., 2013b), and laboratory assessment tools (Colvert et al., 2011; Eigsti et al., 2011; Loman et al., 2013; Merz et al., 2013c; Tottenham, Hare, Quinn, McCarry, Nurse, Gilhooly et al., 2010). Although at first this effect may appear counterintuitive, it might reflect that children are more likely to be removed from birth families at an earlier age (and as a result placed for adoption sooner) due to maternal drug or alcohol abuse in utero or more severe and identifiable forms of early maltreatment. It may be that these stronger experiences of maltreatment are in turn associated with executive functioning difficulties. However, no notable correlations were observed between age removed from birth family home and executive functioning, which the previous hypothesis would expect. Furthermore, reported history of abuse did not significantly affect executive functioning performance.

While there was no positive association between age of adoption and the executive functioning measures, a large ($r=.40$) correlation was found between age of adoption and SCQ scores, with children adopted at a later age displaying more social communication traits. This finding is in line with outcomes from the ERA studies that identified a step-wise increase in ‘quasi-autism’ in Romanian orphans adopted after the age of 6 months (Colvert et al., 2008; Kreppner, Rutter, Beckett, Castle, Colvert, Groothues et al., 2007). In these studies none of the children in the comparison group adopted from the UK prior to 6 months of age displayed quasi-

autistic traits. For a portion of these post-institutionalised children these traits showed gradual diminishment from age 4 to 11 years (Rutter, Beckett, Castle, Colvert, Kreppner, et al., 2009). In contrast in this study no correlation was observed between time since adoption and SCQ scores, but as this sample of children were not scoring above the cut-off threshold and there may have been less potential 'recovery' to display.

This study failed to find a correlation between age of adoption and elevated levels of behavioural or emotional difficulties as measured by the SDQ. Older age of placement for adoption has been tentatively associated with elevated levels of behavioural and emotional difficulties as measured by the SDQ (Biehal et al., 2010), however Howe (1997) identified that an increase in behavioural problems was only found for children adopted later and in the context of early adverse care. This study did not measure quality of care although a medium effect size was found when comparing the impact of history of abuse on SDQ scores.

One explanation for the lack of strong correlations between age of adoption and outcome measures is that duration of hypothetical maltreatment is not the best predictor of cognitive and social development. Other pre-adoption variables, such as the quality of care received or 'dose' of maltreatment, are also likely to be important. Childhood maltreatment in the context of both remaining with and being removed from birth families has been associated with difficulties in executive functioning (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008; Cicchetti, 2002; De Bellis, 2005; Hughes, 2011; Pears, Fisher, Bruce, Kim & Yoerger, 2010), social skills (Shonk & Cicchetti, 2001) and mental health (Anda et al., 2006; Gilbert, Widom, Browne, Fergusson, Webb & Janson, 2009; Howe, 1997). A study of over 17,000 adults identified an association between the number of retrospectively reported adverse childhood experiences and poorer outcomes in terms of reported: mental health, somatic disturbances, impaired memory of childhood, sexuality and perceived stress, difficulty controlling anger, and the risk of perpetrating intimate partner violence (Anda et al., 2006). Additionally positive correlations between ratings of quality of institutional environment and executive functioning scores, and time spent with birth family before adoption and executive functioning scores have been identified (Hostinar et al., 2012). Quality of pre-adoption care is difficult to measure

retrospectively and as a result this was not explicitly measured in this study. Nonetheless a potential impact of abuse history on SDQ and SCQ scores was noted in this study.

4.2.3 Social communication traits and executive functioning

As introduced in section 1.2.3 executive functioning abilities have been associated with social communication skills. In accordance with previous studies (e.g. Colvert et al., 2008; McEvoy et al., 1993) this study identified a strong correlation between the SCQ and BRIEF with a greater number of social communication traits being associated with more reported executive functioning difficulties. In line with this the BRIEF has previously been found to associate with ratings of: communication, socialisation and social skills (Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002; Janusz, Ahluvalia, & Gioia, 2002), and observations of ASD symptoms (Kenworthy, Black, Harrison, Della Rosa & Wallace, 2009). Of interest no significant correlations were observed between the SCQ and CANTAB performance. A relationship between CANTAB performance and ASD traits has been inconstantly found in the literature to date. Studies such as Kaufman, Zotter, Pixner, Starke, Haberlandt, Steinmayr-Gensluckner et al (2013), Steele, Minshew, Luna & Sweeney (2007) and Ozonoff, Cook, Coon, Dawson, Joseph, Klin et al (2004) have identified differential performance in high functioning individuals with ASD and controls on the CANTAB SOC, SWM and IED tasks and associations between degree of social communication impairment and IED scores. Equally other studies have failed to replicate these effects (e.g. Ozonoff & Strayer, 2001). The lack of association observed between performance on these sub-tests and SCQ scores in this study might partially reflect that none of the children were demonstrating high levels of social communication difficulties, or that an association truly does not exist between these items.

4.3 Strengths and limitations of the current study

Executive functioning deficits have been consistently observed in children with ADHD on a range of assessment tools with the greatest difficulties being observed in tasks assessing response inhibition, working memory, planning and vigilance (Glass, Ware, Crocker, Deweese, Coles, Kable et al., 2013; Willcutt, Doyle, Nigg, Faraone,

& Pennington, 2005). As this sample displayed significantly higher scores on the hyperactivity sub-scale of the SDQ one might question whether difficulties observed on the CANTAB and BRIEF reflected attention and hyperactivity problems as opposed to a distinct executive functioning impairment. The SDQ hyperactivity sub-scale and DAWBA likelihood of meeting the DSM-IV criteria for ADHD correlated strongly with BRIEF reported difficulties, suggesting that they might be assessing related or shared difficulties (see figure 5 for correlations). However, significant correlations were not found between either measure of ADHD and performance on the CANTAB executive functioning sub-tests. Performance on the CANTAB SWM, SOC and IED tasks have continually been shown to be impacted by ADHD (Chamberlain et al., 2011; Fried et al., 2015; Glass et al., 2013) and SWM is one of the core sub-tests within the CANTAB ADHD assessment battery. Therefore if executive functioning difficulties in this study reflected solely ADHD symptoms then a correlation would be expected between the CANTAB scores and measures of ADHD symptoms.

A potential limitation of this study could be the measures used to assess executive functioning. The lack of strong correlations between the executive functioning measures reflects the diversity of the executive functioning construct, and associated difficulties in assessing it. The CANTAB was selected since it is a well validated for this age range (Luciana & Nelson, 2002) and it has been used in a number of studies examining executive functioning in children adopted from institutions. However, executive functioning assessment tools have been criticised for lacking ecological validity as individuals with frontal lobe impairments have demonstrated intact performance on executive functioning tasks but debilitating difficulties in daily life (e.g. Eslinger & Damasio, 1985; Levine, Robertson, Clare, Carter, Hong, Wilson et al., 2000). This might in part reflect the general structure of neuropsychological assessments, which are designed to enable optimal functioning and may be unrepresentative of performance in everyday settings, such as school. Additionally, Ozonoff (1995) noted that computerised tasks might be less sensitive to executive functioning deficits in clinical populations. A strength of this study is that it used a more ecologically valid tool (the BRIEF) alongside the experimental tasks to gain a broader picture of functioning. However, evidence has been varied as to whether the BRIEF correlates with direct tests of executive functioning. Parrish and colleagues

(2007) identified high correlations between the BRIEF and D-KEFS for children with epilepsy. In contrast McAuley, Chen, Goos, Schachar, & Crosbie, (2010) found weak correlations between the BRIEF and direct executive functioning tasks, but strong correlations with parental reports of ADHD symptoms and behavioural difficulties. This study observed strong correlations between the BRIEF and parental report of social communication traits and behavioural problems (see appendix 11 for correlations). Therefore it is possible that the elevated BRIEF scores are detecting broader difficulties or parental reporting biases as opposed to specific executive functioning problems.

This study employed an opt-in recruitment strategy as it was the most viable way to gain access to this non-clinical population. However, this may have consequently led to a recruitment bias, for example parents concerned with their child's cognitive or social development may have been more interested in their child taking part in this study. In turn this could limit the generalisability of findings. Additionally aspects of the analysis may have been impacted by the limited number of participants. For example note-worthy but non-significant effect sizes were observed for the impact of reported history of abuse on parent ratings of social communication traits ($r=.40$) and emotional and behaviour difficulties ($r=.43$). This might reflect an underlying issue with the statistical power for the findings outside of the main hypotheses.

4.4 Future implications

The identification of executive functioning difficulties in this paper, as well as evidence relating to the impact of early adverse experiences on cognitive development, indicate a need for further research to clarify the nature of adopted children's executive functioning abilities. Larger comparison studies including post-institutionalised, looked after and non-adopted children would be useful to disentangle the influence of pre-placement experiences and in particular the impact of dose of maltreatment and quality of pre-adoptive care. Furthermore, prospective longitudinal studies identifying and assessing children from point of adoption might enable a more accurate picture of potential risk factors for executive functioning, emotional, behavioural or social communication difficulties. Longitudinal studies could also offer the opportunity to explore the developmental trajectory of these

areas over time, this study only explored whether linear associations existed and did not consider the possibility of non-linear trajectories.

Of importance this study highlights that a sample of ‘non-clinical’ adopted children showed elevated difficulties across a range of areas. If these findings are validated in larger, representative samples then it would suggest that this is a population that might benefit from the development of specific clinical services offering early proactive support to address the aforementioned difficulties using evidence based interventions.

4.5 Conclusions

Overall, this study identified that a sample of children adopted from UK foster care showed poorer performance compared to normative data on both parental report and laboratory executive functioning assessment measures. These findings were specific, in so far as they were observed in the context of preserved overall cognitive ability and a measure of visual memory. These results are largely in line with the current (limited) literature base. The identified differences in performance between measures of executive functioning alongside the deficits observed across them, is in line with models of executive functioning which suggest it to be a broad construct. Furthermore, the lack of identified cognitive and memory difficulties support that executive functioning is distinct from general cognitive abilities. Controlling for ADHD the BRIEF scores demonstrated a strong negative correlation with age of adoption. This finding is contrary to a number of studies of post-institutionalised children where later age of adoption has been shown to negatively impact development. In line with this the SCQ scores demonstrated a strong positive correlation with age adopted. In addition elevated emotional and behavioural difficulties were identified. No other strong associations between the measured pre-adoption variables and outcomes at age 7-11 years were identified.

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6. Appendices

6.1 Appendix 1 – the research advert circulated via email and published in the Adoption UK magazine



Study assessing the intellectual functioning of children adopted from within the UK.

REC Reference Number: PNM/13/14-117

This project hopes to understand more about the executive functioning abilities of adopted children. Executive functioning is key processes involved in a child's academic development. Studies show that children who are adopted, and who have experienced maltreatment, are more likely to show executive functioning difficulties. This can manifest as difficulties with planning and organisation (e.g. following instructions). Understanding the intellectual profile of adopted children can enable services to tailor recommendations and support for adoptive families.

What does this study involve?

- Parents will complete 3 questionnaires about your child looking at; mental health, executive functioning and social communication traits. In addition we would like to collect some demographic information.
- Your child will completing a face to face assessment measuring their intellectual and executive functioning abilities. This assessment will occur in an NHS children's outpatient centre in south east London and will last approximately 2 hours.

What does my family get out of this study?

Following the assessment you will receive a letter summarising the results of your child's intellectual and executive functioning assessment.

Who can take part?

We are looking for children aged 7-11 who were adopted from the UK. We are not including children who have a diagnosis of Autistic Spectrum Disorder or an identified learning disability.

For further information please contact : alexandra.a.wretham@kcl.ac.uk

6.2 Appendix 2 – Demographic questionnaire.

| CHILD DEMOGRAPHIC DETAILS | |
|--|---|
| Age (in years and months) | ..... ..... |
| Gender | Male <input type="checkbox"/> Female <input type="checkbox"/> |
| Ethnicity | ..... |
| PARENT DEMOGRAPHIC DETAILS | |
| No. of parents | ..... |
| Parent age | ..... |
| Parent gender | ..... |
| Ethnicity | ..... |
| CHILD HISTORY | |
| Birth family mental health issues (parents or siblings) | ..... ..... ..... |
| Birth / pregnancy complications (please tick all that apply) | <input type="checkbox"/> Alcohol/ drugs exposure <input type="checkbox"/> Special care baby unit <input type="checkbox"/> Other Please describe |
| Age when left birth family (in years and months) | ..... |
| Age when placed for adoption (in years and months) | ..... |
| Age when adoption order granted (in years and months) | ..... |
| Time in foster care | ..... |
| Number of moves | ..... |

| | |
|---|---|
| <p>Siblings</p> <p>In current home [related /unrelated]</p> <p>Other related siblings</p> <p>Maltreatment or Neglect (please tick all that apply)</p> | <p>.....</p> <p>.....</p> <p>Physical abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Emotional abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Sexual abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Neglect Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> |
| <p>Age when child arrived at your family (in years and months)</p> | <p>.....</p> |
| <p>What services have you used? (please tick all that apply)</p> | <p><input type="checkbox"/> General CAMHS</p> <p><input type="checkbox"/> Specialist NHS adoption (or looked after child service)</p> <p><input type="checkbox"/> Local Authority post adoption service</p> <p><input type="checkbox"/> Peer to peer, e.g. support groups</p> <p><input type="checkbox"/> Independent: free or charging</p> |
| <p>Any identified mental health issues?</p> | <p>.....</p> <p>.....</p> <p>.....</p> |
| <p>Does your child get any educational support?</p> <p>Does your child attend a mainstream or specialist school?</p> <p>Statement of educational need</p> | <p>.....</p> <p><input type="checkbox"/> Mainstream School</p> <p><input type="checkbox"/> Specialist School</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> |

6.3 Appendix 3 – Ethics approval letter

Alexandra Wretham
Addiction Sciences Building
4 Winsdor Walk
London SE5 8AF

15 May 2014

Dear Alexandra,

PNM/13/14-117 Executive functioning ability and social communication traits measured in children adopted from the UK

Review Outcome: Full Approval

Thank you for sending in the amendments/clarifications requested to the above project. I am pleased to inform you that these meet the requirements of the PNM RESC and therefore that full approval is now granted.

Your approval is based on the following provisos being met:

1. Section 1.3: It is assumed that Dr Patrick Smith has a substantive contract of employment with the College.
2. Section 6.3: Please ensure that your approach to excluding ineligible participants is sufficiently sensitive.

You are not required to provide evidence to the Committee that these provisos have been met, but your ethical approval is only valid if these changes are made. You must not commence your research until these provisos have been met.

Please ensure that you follow all relevant guidance as laid out in the King's College London Guidelines on Good Practice in Academic Research (<http://www.kcl.ac.uk/college/policyzone/index.php?id=247>).

For your information ethical approval is granted until 15 May 2017. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not be sent a reminder when it is due to lapse.

Ethical approval is required to cover the duration of the research study, up to the conclusion of the research. The conclusion of the research is defined as the final date or event detailed in the study description section of your approved application form (usually the end of data collection when all work with human participants will have been completed), not the completion of data analysis or publication of the results.

For projects that only involve the further analysis of pre-existing data, approval must cover any

period during which the researcher will be accessing or evaluating individual sensitive and/or un-anonymised records.

Note that after the point at which ethical approval for your study is no longer required due to the study being complete (as per the above definitions), you will still need to ensure all research data/records management and storage procedures agreed to as part of your application are adhered to and carried out accordingly.

If you do not start the project within three months of this letter please contact the Research Ethics Office.

Should you wish to make a modification to the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications:

<http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx>

Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance

(<http://www.kcl.ac.uk/innovation/research/support/ethics/contact.aspx>)

We wish you every success with this work.

Yours sincerely,

James Patterson – Senior Research Ethics Officer

Cc: Patrick Smith

6.4 Appendix 4 – Ethics amendments approval letter

Alexandra Wretham
Addiction Sciences Building
4 Windsor Walk
London SE5 8AF

13 August 2014

Dear Alexandra,

PNM/13/14-117 Executive functioning ability and social communication traits measured in children adopted from the UK

Thank you for submitting a modification request form for the above study. I am writing to confirm approval of this. The modification is summarised broadly below:

1. Section 1.4: Addition of Consortium of Voluntary Adoption Agencies and British Association of Adoption and Fostering as gatekeeper organisations.

If you have any questions regarding this application please contact the Research Ethics Office.

Yours sincerely,

James Patterson - Senior Research Ethics Officer

Cc: Patrick Smith

PARTICIPANT INFORMATION SHEET

REC Reference Number: **PNM/13/14-117**

Executive functioning and social communication traits in children adopted within the UK

We would like to invite you to participate in this doctoral research project. You should only participate if you want to; choosing not to take part will not disadvantage you or your child in any way. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of this study?

This study is funded by Kings College London. It hopes to try and understand more about the executive functioning abilities and social communication skills of children adopted from within the UK. Executive functioning and social communication are key processes involved in a child's academic and social development. The term executive functioning encompasses a number of important mental processes involved in: problem solving, memory and planning. We hope that understanding more about these processes may help services to tailor their provisions for this population to ensure that adopted children and families receive the most appropriate support.

Why have I been chosen?

This study is recruiting children aged 7-11 years who were adopted from the UK and do not have a diagnosis of Autistic Spectrum Disorder or an identified learning disability. You have been chosen as a potential family following responding to an advertisement sent out by Adoption UK.

What does this study entail?

The executive functioning ability and social communication traits will be measured through parental report and cognitive assessments. Parents will be asked to complete 3 questionnaires about your child; one looking at mental health, one assessing executive functioning and one assessing social

communication traits. In addition we would like to collect some demographic information e.g. ethnicity and age of adoption to enable us to consider important factors which may affect performance on the cognitive assessments. The second stage of the study would involve your child completing a face to face assessment measuring their intellectual and executive functioning abilities. This assessment will occur in an NHS children's outpatient centre in south east London and it will last approximately 2 hours.

What are the benefits of the study?

Following completion of the assessment you will be sent a brief letter outlining the results of your child's intellectual and executive functioning assessments. This can help you better understand how your child learns and in turn help you support your child's academic development. As a thank you for taking part in the study we will also give your child a £10 gift voucher.

Are there any risks if I take part?

There are no known risks involved in the study and most children report enjoying the assessments. If you have any concerns about the study then you are welcome to contact the main researcher, Alexandra Wretham (Clinical Psychologist in Training) to discuss them.

Do I have to take part?

No, taking part is voluntary. Your decision whether or not to take part will not affect any ongoing healthcare, including future or current treatment. If you decide to take part you are free to withdraw at any time without giving a reason. You may also withdraw any data or information you have already provided up until it is analysed for use in the final report (before 31st March 2015). If you are interested in taking part then we will contact you by phone to discuss this study further.

Will my taking part in this study be kept confidential?

All information which is collected from the study will be kept strictly confidential. To ensure confidentiality we will allocate each family a study ID. Questionnaires and assessment results will be stored in locked filing cabinets that will only be accessible to the research staff involved in this study. Your results will also be entered into a computer file for statistical analysis, but your name will not be included and the files will be password protected.

The requirements of the 1998 Data Protection Act will be complied with at all times, and the research has been approved by the Psychiatry, Nursing and Midwifery (PNM) Research Ethics Subcommittee (RESC) at King's College London (ref **PNM/13/14-117**).

The only time that we might have to break confidentiality would be if we thought that you or someone else might be at risk of harm, or if we became aware of issues of a criminal nature. If we thought either yourself or someone was at risk of harm, we would try to talk to you about the issue prior to breaking confidentiality.

What will happen to the results of this study?

This study should be completed by June 2015. The results will be written-up as part of Alexandra Wretham's Doctoral Thesis in Clinical Psychology, and if possible, will also be published. None of the individual questionnaires or experimental results will be displayed in the results so you will not be identifiable in the report.

Who can I contact for further information?

If you have any questions or require more information about this study, please contact the researcher using the following contact details:

Researcher: Alexandra Wretham

Email address: alexandra.a.wretham@kcl.ac.uk

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below for further advice and information: The Chair, Psychiatry, Nursing and Midwifery Research Ethics Subcommittee, rec@kcl.ac.uk

Thank you for taking the time to consider this research study!

Study information!

We would like you to take part in a study! This sheet will tell you a bit about the study and how you could be involved. Please read it carefully and discuss it with your parents if you have any questions. You can also contact us if anything is unclear or if you want more information.

What is the study?

This study is looking at two skills which are involved in doing well at school and developing friendships. We want to learn more about these skills so that we can help children who struggle in these areas.

Why have I been chosen?

We are sending you this sheet as your parents responded to our advert. We are looking for children aged 7-11 years to take part in this study.

What do I have to do?

We will invite you to come and complete an assessment with us. This will involve you answering some questions and completing some puzzles. Some of these will be on a computer and most children find them fun. We will also ask your parents to fill out some questionnaires to send to us. After this we will send your parents a letter saying how you did, this will help them understand the things that you do really well in and things you find a bit more difficult. As a thank you for taking part in the study we will also send you a £10 gift voucher.

Do I have to take part?

No, it is up to you and your parents to decide whether you want to be part of this study. If you decide to take part and then change your mind, that is okay, you are allowed to leave the study at any time and you don't have to give us a reason.

Will people know that I am in this study?

No, all information will be confidential. This means that we won't tell people you are in this study. It also means that we won't show this information to

anyone and we will remove your name from questionnaires so that people won't be able to work out who they belong to. All your information will be stored in a safe, locked, place that only people involved in this study will be able to access. The only time that we might have to tell someone that you are involved in the study is if we are worried that you or someone else might be at risk of harm.

What will happen to my results?

Your results will be analysed on the computer with everyone else's. These results will then be written up as a bigger report which might be published in a scientific journal. The information about you will not be displayed in this report.

Who can I contact for further information?

If you have any questions then please speak to your parents. If they can't answer these then they can contact us to get more information.

Thank you!

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.



Title of Study: *Executive functioning and social communication traits in children adopted within the UK*

King's College Research Ethics Committee Ref: PNM/13/14-117

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

- I understand that if I, or my child, decide at any time during the research that we no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my child's data up to 31st March 2015.
- I consent to the processing of my child's personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998.

Participant's Statement:

I _____ (*insert name*) agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed

Date

Investigator's Statement:

I, Alexandra Wretham, confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the participant.

Signed

Date

6.8 Appendix 8 – Child consent form

King's College Research Ethics Committee Ref: PNM/13/14-117

PARTICIPANT CONSENT FORM

If you want to take part in this study, please complete this form with your parent's help and return it in the stamped addressed envelope provided.

Please tick the boxes below

I have read the Study Information sheet and I have been able to ask any questions that I have about the study.

I know it is up to me and my parents to decide whether I want to be part of this study. I know that if I take part in this study, it is okay for me to change my mind and leave the study at any time, without giving a reason.

I understand that the only time that the researchers might have to tell someone that I am involved in the study is if they are worried that I or someone else might be at risk of harm.

I agree to take part in this study.

Your name

Date

Signature

Researchers name

Date

Signature

1 for participant; 1 for researcher



2nd January 2015

REC Reference Number: PNM/13/14-
117

Research summary

Dear Mrs X,

Thank you for attending the research assessment on the 1st January 2015 with your son xxx. This letter will briefly summarise xxx's performance on the intellectual and cognitive functioning assessments. In addition it will report the results from the mental health screening questionnaire which you completed prior to the assessment. Please note that this is not a clinical assessment report.

Mental health screening questionnaire

The Development and Well-Being Assessment (DAWBA, Goodman et al, 2000) is used to screen for psychiatric symptoms and associated functional impairment in children aged 5-17 years. The table below displays your parental ratings on the DAWBA. Responses marked with a '++' or '+++' reflect that you may have some concerns about your child's functioning in these areas. You might wish to discuss areas rated as '++' or '+++' with your GP to see if a formal assessment with a child and adolescent mental health service (CAMHS) would be helpful.

| | Parental report of symptoms | Parental report of impact on functioning |
|-----------------------------------|-----------------------------|--|
| Autistic Spectrum Disorder | - | - |
| Separation Anxiety | - | - |
| Specific Phobia | + | - |
| Social Phobia | - | - |

| | | |
|---------------------------------------|----|----|
| Panic Disorder | - | - |
| Agoraphobia | - | - |
| Post Traumatic Stress Disorder | - | - |
| Obsessive Compulsive Disorder | - | - |
| Generalised Anxiety | - | - |
| Depression | + | - |
| Deliberate Self Harm | ++ | - |
| Hyperactivity | + | ++ |
| Oppositional behaviour | + | - |
| Conduct disorder | + | - |
| Eating disorders | - | - |
| Tics | - | - |
| Other concerns | - | - |

Intellectual performance

The second version of the Wechsler Abbreviated Scale of Intelligence (WASI-II; Wechsler, 2011) was administered to gain a general overview of xxx's intellectual functioning. The WASI-II is a short battery of tests which measures various facets of intelligence and yields 3 intellectual functioning indices;

- 1) The VCI looks at stored verbal information.
- 2) The PRI measures nonverbal fluid abilities and coordination skills.
- 3) The FSIQ is an estimate of general intellectual ability.

The table below displays xxx's performance in relation to other children of the same age. IQ scores on the WASI-II have a mean of 100 and a standard deviation of 15. The percentile scores reflect the percentage of scores in the normative data that are the same or lower than your child's score. For example, a score at the 60th percentile means that the child's score is the same as or higher than the scores of 60% of children of the same age in the standardised population.

| | IQ score | Percentile | Ability Level |
|---|-----------------|-------------------|----------------------|
| Verbal Comprehension Index (VCI) | 95 | 37 th | Average |
| Perceptual Reasoning Index (PRI) | 95 | 37 th | Average |
| Full Scale IQ (FSIQ) | 95 | 37 th | Average |

Overall xxx scored in the average range.

Executive functioning

xxx completed a number of sub-tests from the Cambridge Neuropsychological Test Automated Battery (CANTAB). These tasks assess aspects of your child's memory, attention and executive functioning.

- 1) Spatial Working Memory looks at the ability to remember and then use visual information.
- 2) Paired Associate Learning assesses visual memory and how easy it is to learn new things.
- 3) Stocking of Cambridge is a test of practical planning and problem solving.
- 4) Intra-Extra Dimensional Set Shift requires an individual to correctly identify patterns to guide their answers and then identify when the pattern changes so they can respond to this by shifting their responses accordingly.

| Domain | Sub-test | Description of Performance |
|-----------------------|-----------------------------------|--|
| Visual Memory | Spatial Working Memory | <i>Low Average - Borderline</i> |
| | Paired associate learning | <i>Average</i> |
| Executive functioning | Stockings of Cambridge | <i>Average</i> |
| | Intra-Extra Dimensional Set Shift | <i>Low Average</i> |

Recommendations and resources

- If you are concerned about your child's mental or physical health then we advise you to contact your GP or local Child and Adolescent Mental Health Service to discuss this further.
- If you are concerned about your child's cognitive development then please contact your GP to discuss this further.
- If your child is experiencing academic difficulties at school you may wish to consult your child's school or an educational psychologist.
- You can find more information about the national adoption and fostering services at <http://www.national.slam.nhs.uk/services/camhs/camhs-adoptionfostering/>

Below are some practical recommendations which can be helpful to support children with executive functioning difficulties.

1. Tasks can be broken down into smaller chunks of information to help support a child's working memory. So for example if a child struggles to complete multi-step commands you could try reducing the number of steps in the command.
2. For individuals who demonstrate difficulties keeping track of more than one or two steps at a time, providing a written checklist of steps required to complete a task can serve as an external memory support.
3. For children who are easily distracted it can be useful to try and find a quiet area away from distractions when you ask a command. Similarly in school it can be helpful for the child to sit away from distractions (e.g. near the teacher) to support their attention.
4. It can be helpful to check that your child has heard and understood what is required (e.g. by asking them to repeat it back).
5. Short 'brain breaks' can be useful for children who struggle to maintain focus on a task. Examples of quick 'brain breaks' include: running a short errand, getting a drink or bringing work to show the teacher or parent.

Thank you for taking part in this study, we hope that you have found this research report useful. If you have any questions about this study, please contact the lead researcher via the email address alexandra.a.wretham@kcl.ac.uk.

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below for further advice and information: The Chair, Psychiatry, Nursing and Midwifery Research Ethics Subcommittee, rec@kcl.ac.uk

Yours sincerely,

Alexandra Wretham

Lead researcher, Trainee Clinical Psychologist

Supervised by Dr Matt Woolgar

Consultant Clinical Psychologist and Senior Researcher

6.10 Appendix 10 – skew and kurtosis scores for the SCQ, BRIEF and CANTAB

| | | CANTAB IED errors adjusted | CANTAB PAL total errors | CANTAB SOC problems solved | CANTAB SWM total errors | SCQ score | BRIEF_GEC |
|---------------------------|---------|----------------------------------|-------------------------------|-------------------------------------|-------------------------------|--------------|-----------|
| N | Valid | 30 | 27 | 26 | 30 | 30 | 30 |
| | Missing | 0 | 3 | 4 | 0 | 0 | 0 |
| Mean | | -.4470 | .0522 | -.2912 | -.7947 | 4.7000 | 65.3333 |
| Std. Deviation | | .83680 | .76592 | .93506 | 1.02243 | 3.73382 | 13.11312 |
| Variance | | .700 | .587 | .874 | 1.045 | 13.941 | 171.954 |
| Skewness | | 1.556 | -2.097 | -.323 | -.644 | .568 | -.436 |
| Std. Error of Skewness | | .427 | .448 | .456 | .427 | .427 | .427 |
| Kurtosis | | 2.159 | 6.749 | .324 | .726 | -.976 | -.484 |
| Std. Error of Kurtosis | | .833 | .872 | .887 | .833 | .833 | .833 |
| Range | | 3.35 | 3.80 | 4.09 | 4.54 | 12.00 | 52.00 |
| Minimum | | -1.57 | -2.82 | -2.51 | -3.30 | .00 | 37.00 |
| Maximum | | 1.78 | .98 | 1.58 | 1.24 | 12.00 | 89.00 |

6.11 Appendix 11 - Displays the Pearson's r correlation value for reported demographic variables and measures.

| | BRIEF GEC | CAN TAB IED | CAN TAB SOC | CAN TAB SWM | SDQ total | WASI -II FSIQ | SCQ total | Age | Age left birth family | Age Adopt ed | Time since adopt ion |
|--------------------------------|--------------|-------------------|-------------------|-------------------|--------------|---------------------|--------------|--------|--------------------------------|--------------------|-------------------------------|
| BRIEF GEC | 1 | .011 | .063 | -.158 | .661** | -.192 | .610** | -.035 | .138 | .176 | -.050 |
| CAN TAB IED | .011 | 1 | 0.242 | 0.142 | -.139 | -.040 | .013 | -.401* | -.189 | -.112 | -.219 |
| CAN TAB SOC | .063 | 0.242 | 1 | .438* | -.005 | .293 | .173 | -.137 | .199 | .134 | -.254 |
| CAN TAB SWM | -.158 | 0.142 | .438* | 1 | -.044 | .294 | .024 | .104 | .189 | .253 | -.227 |
| SDQ total | .661** | -.139 | -.005 | -.044 | 1 | -.155 | .408* | .180 | .183 | .183 | .065 |
| WASI -II FSIQ | -.192 | -.040 | .293 | .294 | -.155 | 1 | -.070 | .163 | .142 | .179 | -.158 |
| SCQ total | .610** | .013 | .173 | .024 | .408* | -.070 | 1 | .036 | .221 | .396* | -.188 |
| Age | -.035 | -.401* | -.137 | .104 | .180 | .163 | .036 | 1 | .037 | .083 | .459* |
| Age left birth family | .138 | -.189 | .199 | .189 | .183 | .142 | .221 | .037 | 1 | .882** | .713** |
| Age Adopt ed | .176 | -.112 | .134 | .253 | .183 | .179 | .396* | .083 | .882** | 1 | .773** |
| Time since adopt ion | -.050 | -.219 | -.254 | -.227 | .065 | -.158 | -.188 | .459* | .713** | .773** | 1 |

* $p < .05$

** $p < .001$

Service Evaluation Project

EVALUATION OF A LONG TERM
HEALTH CONDITIONS GROUP FOR
INDIVIDUALS WITH ANXIETY AND
DEPRESSION

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Abstract

Individuals with long-term medical health conditions (LTC) are at increased risk for experiencing co-occurring mental health difficulties. This dual-diagnosis of mental and physical health conditions is associated with poorer overall physical health, more reported impairments in daily functioning and reduced ratings of quality of life. Furthermore it has a wider societal impact in terms of increased service usage and cost of care. As a result developing effective interventions for these individuals is a priority.

This service evaluation project examines a step 2 group based intervention for individuals with LTC and anxiety and depression, the Wellbeing group. The outcomes of 20 group completers were included in the analysis. The effectiveness of the Wellbeing group was analysed through evaluating clinical measures used to assess: psychological wellbeing (PHQ-9, GAD-7), social functioning (WSAS) and quality of life (EuroQoL). In addition service user feedback was examined to aid development of the group and determine the acceptability of the group.

The analysis identified that the Wellbeing group was an effective intervention for decreasing self-report levels of depression, anxiety and work and social functioning. This was demonstrated by statistically significant reductions in reported difficulties, medium effect sizes were observed for all measures. Statistically significant changes were not identified on the EuroQol however there was an observed increase in subjective health state as measured by the EuroQol VAS. In addition the service user feedback and low attrition rates support the idea that this may be an acceptable intervention.

These findings are in line with previous research looking at psychological interventions for individuals with LTC and co-morbid anxiety and/or depression. In summary the Wellbeing group appears to be a useful low intensity intervention for service users with LTCs and mild to moderate anxiety and/or depression. Scope for further improvement in the research and validation of the Wellbeing group is discussed.

1. Introduction

1.1 Overview

In 2011 the British Government introduced the ‘No health without mental health’ strategy (Department of Health, 2011, see section 1.3 for more information). One of the key objectives of this strategy was to improve the mental health of individuals with long term (also known as chronic) physical health conditions (henceforth referred to as LTC).

This project will be evaluating the effectiveness of a psychological group intervention implemented by Southwark Improving Access to Psychological Therapies (IAPT) service. This was developed in response to the ‘No health without mental health’ strategy. This project will examine the outcomes of three pilot groups and one subsequent treatment group with the following aims:

- 1) To assess the effectiveness of the group treatment for individuals with LTC and co-morbid depression
- 2) To examine the acceptability of the intervention through service user feedback
- 3) To incorporate service user feedback to continue to aid development of the group

1.2 Government strategy regarding physical and mental health

In 2011 the British Government introduced the ‘No health without mental health’ strategy. This strategy set out six key objectives:

1. More people will have good mental health
2. More people with mental health problems will recover
3. More people with mental health problems will have good physical health
4. More people will have a positive experience of care and support
5. Fewer people will suffer avoidable harm
6. Fewer people will experience stigma and discrimination

The government's third objective that 'more people with mental health problems will have good physical health' focuses on the bi-directional relationship between mental and physical health. In this strategy they reported that individuals with LTCs are at an increased risk of developing mental health problems, furthermore the development of mental health problems is associated with long-term negative consequences. Within this particular objective the government aimed to decrease the mortality rates for individuals with mental health conditions and to improve the mental health of individuals with poor physical health. As part of this, IAPT were chosen to lead to extension of talking therapies to individuals with LTC and medically unexplained symptoms (MUS).

1.3 Improving Access to Psychological Therapies (IAPT)

IAPT is an NHS programme that began being rolled out nationally in 2008. It was designed to treat individuals with depression and anxiety disorders using only interventions approved by the National Institute of Health and Clinical Excellence (NICE). The second phase of the programme commenced following the publications of 'Talking Therapies: a four year plan of action' and 'No health without mental health' in 2011. This aimed to expand the IAPT programme to children and young people, and people with LTC, MUS or severe mental illness. (DoH, 2012). This project is focusing on one specific IAPT service based within London. Southwark IAPT is a primary mental health service that was initially launched in 2008. In February 2012 Southwark IAPT was awarded joint funding with Bexley Mind to become one of the 15 IAPT LTC/MUS Pathfinder sites.

1.4 Pathfinders project

Following the second phase of IAPT roll out, IAPT and non-IAPT psychological providers were invited to apply to become an IAPT LTC/MUS Pathfinder site in December 2011. 15 sites were chosen in February 2012 and the project began to be rolled out on the 1st April 2012 (de Lusignan et al., 2013). The aims of the LTC/MUS pathfinder project were to determine: the optimal stepped care treatment pathway for LTC/MUS patients, the needed therapy components and the required staff training. This pathfinder project also plans to evaluate the cost effectiveness and

efficiency of treatment models. In addition, it will consider the effectiveness of psychological interventions for LTC/MUS patients.

1.5 LTC definition

The DoH website defines LTC as “*a health problem that can’t be cured but can be controlled by medication or other therapies*” These include (but are not limited to): cardiovascular conditions, diabetes, chronic obstructive pulmonary diseases, arthritis and so on. In addition conditions such as cancer and HIV are increasingly being conceptualised within this definition due to the prolonged life expectancy associated with medical advancements. The term LTC could also encompass certain enduring mental health conditions (e.g. depression and psychosis). However this project will use the term LTC to refer solely to physical health conditions, to reflect the intervention being examined.

1.6 LTC prevalence

According to the DoH (2013) over 15 million individuals in England have a LTC (approximately one quarter of the population). This figure is estimated to rise with the increase in life expectancy and associated increase in the development of conditions such as dementia.

1.7 Mental health

The World Health Organisation (WHO) defines mental health as being a state of wellbeing in which an individual realizes his/her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his/her community (WHO website, 2013). The DSM-IV-TR describes a mental disorder as

“a clinically significant behavioural or psychological syndrome or pattern that occurs in an individual and that is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more areas of functioning) or with significantly increased risk of suffering death, pain, disability, or an important loss of freedom. In addition this syndrome or

pattern must not be merely an expectable and culturally sanctioned response to a particular event, for example the death of a loved on”.

This study will predominantly focus on individuals presenting with depression, and therefore will not go into depth describing other mental health conditions.

1.8 Depression definition

Depression is broad diagnosis that covers a number of heterogeneous presentations of varying severity and longevity. The 10th edition of the International Classification of Diseases (ICD-10) describes the key symptoms of depression as persistent sadness or low mood and/or loss of interests or pleasure, fatigue or low energy. To reach a diagnosis of depression the ICD-10 stipulates that one or more of these symptoms must be present for the majority of the time over the previous 2 weeks. Other commonly reported symptoms of depression included in the ICD-10 are:

1. Reduced concentration and attention
2. Reduced self-esteem and self-confidence
3. Ideas of guilt and unworthiness
4. Bleak and pessimistic views of the future
5. Ideas or acts of self-harm or suicide
6. Disturbed sleep
7. Diminished appetite

The ICD-10 categorises first depressive episodes into 3 broad categories: mild, moderate and severe. Further subdivisions exist for individuals with recurrent depressive disorder. It has also been recognised that individuals presenting with persistent sub-threshold depressive symptoms may also experience distress and have a marked impact on their functioning, as a result NICE guidance includes 'subthreshold depressive symptoms' (See section 1.17).

1.9 Depression prevalence

Depression is one of the most common adult mental health disorders. Moffitt et al (2010) found lifetime prevalence rates varied between 16.9 and 41.4% depending on whether the study was prospective or retrospective. In older community populations the prevalence of depression has been estimated to be between 10 and 15% (Lindesay et al., 1989; Livingston et al., 1990). Depression can have a severe impact on quality of life, physical health and it is the number one cause of disability worldwide (Murray and Lopez, 1997).

1.10 Prevalence of co-morbid mental health problems

It should be remembered that psychological diagnosis are highly co-morbid. Kessler et al (1994) estimated that 32-80% of individuals with one psychological disorder have at least one further co-morbid disorder. Of note, depression and anxiety disorders have been found to frequently co-occur. For example Beekman et al (2000) found that 48% of individuals aged 55 to 85 years with depressive disorders also met the criteria for an anxiety disorder, and 26% of individuals with an anxiety disorder met the criteria for a depressive disorder. Therefore although this study is focussing on individuals with depression it is likely that a number of the participants could also be experiencing symptoms of anxiety or meet the criteria for a co-morbid anxiety disorder.

1.11 Prevalence of co-morbid mental health conditions and LTC

Research has consistently shown that many individuals with LTC have co-occurring mental health difficulties. This has been observed in a range of LTC e.g. Chronic Obstructive Pulmonary Disorders, COPD (Kunik et al., 2005; Yohannes, 2000; Livermore et al., 2010), migraines (Juang et al., 2000), diabetes (Finkelstein et al., 2003; Grigsby et al., 2002) and arthritis (Theis et al., 2007). Overall research estimates that individuals with LTC are two to three times more likely to experience mental health problems compared to the general population (Naylor et al., 2012). This effect has been observed in a range of countries. Moussavi et al (2007) studied 245,404 individuals from 60 countries from all regions of the world and found

statistically significantly higher prevalence rates of depression in individuals with a LTC (angina, arthritis, asthma and diabetes) than those without a LTC. They found that on average between 9.3% and 23% of participants with one or more LTC had co-morbid depression.

Although much of the evidence base has looked specifically at depression there is also evidence that some LTC are associated with an increased prevalence of other conditions such as anxiety disorders (Goodwin et al., 2009) and dementia (Xu et al., 2009; Ohara et al., 2011). However this project will focus primarily on depression.

1.12 Impact of co-morbid mental health conditions on physical health

The dual diagnosis of LTC and depression is associated with poorer overall physical health (Mathers et al., 2001; Moussavi et al., 2007). Moussavi et al (2007) demonstrated that co-morbid depression and LTC lead to significantly lower mean health scores than either depression or one or more LTCs alone. This effect was particularly prominent for diabetes where the mean health scores fell from 78.9 to 58.5 when looking at individuals with co-morbid depression. This effect remained when adjusting for socio-demographic factors, country and economic factors.

The addition of depression alongside a LTC has also been demonstrated to increase clinical symptomology. For example Whooley et al (2008) found that after adjusting for co-morbid conditions and cardiac disease severity, participants with baseline depression and coronary heart disease showed 31% more cardiovascular events (heart failure, myocardial infarction, stroke, transient ischemic attack or death) than those without depression. In line with this, the addition of mental health problems has shown increased risk of mortality compared to individuals with LTC alone (Blumenthal et al., 2003; Junger et al., 2005). Furthermore De Jonge et al (2007) suggested that non-response to depression treatment following myocardial infarction might be associated with cardiac events.

1.13 Functional impact of co-morbid mental health conditions

In addition to the physical implications of co-morbid LTC and mental health conditions, there is evidence to suggest that this combination also has detrimental effects on an individual's daily functioning. Research has shown that individuals with LTC and co-morbid depression demonstrate poorer self care (Das-Munchi et al., 2007) and less compliance with treatment (e.g. DiMatteo et al., 2000; Theofilou, 2013; Vamos et al., 2009; Gehi et al., 2005). For many LTCs self care and treatment compliance are vital to minimise clinical symptomology, therefore problems in these areas could be influencing the increase in reported physical problems. Similarly co-morbid depression and LTCs have been associated with decreased physical activity (e.g. Ruo et al., 2004). Whooley et al (2008) found that after adjusting for co-morbid physical conditions and cardiac disease severity, depressive symptoms were associated with a 31% increased rate of cardiovascular events. However, this association did not remain after adjusting for physical inactivity and other health behaviours. Therefore it may be that the behavioural consequences of low mood (i.e. physical inactivity and poorer self care) affect clinical symptoms.

1.14 Impact of co-morbid mental health conditions on an individuals' quality of life

Alonso and colleagues (2004) looked at the impact of LTC on health related quality of life (QoL) using a large sample across 8 countries. They found that in all 8 countries individuals with LTC scored poorer on health related QoL measures than individuals without a LTC. Similarly a number of studies have demonstrated that depression is associated with poorer QoL ratings of (e.g. Rapoport et al., 2005; Wittchen et al., 2000). De Jong et al (2006) examined the effects of depressive symptoms on the QoL of individuals with cardiovascular diseases. They found depressive symptoms had a bigger impact on QoL than the severity of cardiac problems. Furthermore Lim et al (2012) demonstrated that the combination of depression and a LTC negatively affects an individual's QoL greater than either condition alone. Therefore there is evidence to suggest that individuals with LTC and co-morbid mental health conditions may be experiencing a substantially reduced QoL.

1.15 Wider costs of co-morbid mental health conditions and LTC

The impact of the combination of LTC and mental health problems has wider societal implications. For example this group of individuals have been shown to use clinical services more frequently (e.g. Teeson et al., 2009). A UK survey showed that individuals with diabetes and mental health problems utilised more GP consultations and experienced more hospital admissions than those with diabetes alone (Das-Munshi et al., 2007). Currently individuals with LTC account for 70% of the total health and care expenditure (over £70 billion per annum, DoH, 2013). The increased service use for individuals with LTC and depression has been reflected by a substantial increase in the cost of care compared to individuals with LTC alone (e.g. Hochlehnert et al., 2011; Hutter et al., 2010; Simon et al., 2005). Melek and Norris (2008) looked at USA data for national health cost claims. They found individuals with LTC and anxiety or depression spent approximately 33-169% more on medical expenditure per month (excluding the cost of mental health services). Similarly in 2012 Naylor and colleagues estimated that there was a 45-75% increase in cost of care after adjusting for severity of the physical condition. (See Naylor et al., 2012 for a more in depth financial review).

Finally the combination of mental health conditions and LTC has been shown to impact on employers. Compared to individuals with LTC alone this group show more absence from work and sick days, furthermore on top of the cost of statutory sick pay, companies are likely to be losing money due to the impact on productivity (Hutter et al., 2010; Druss et al., 2000).

1.16 Impact on carers

Chronic illness does not affect just the individuals with the LTC they also have a wider impact on family members who may find themselves becoming an informal carer for their relatives. It has been found that caring for a relative with a LTC or a mental health condition can have significant influences on carers psychological, physical and social wellbeing (Lim and Zebrack., 2004; Magliano et al., 2005). Furthermore being an informal carer is associated with substantial financial costs (e.g. McCrone et al., 2008).

1.17 Psychological treatments for depression

The NICE guidelines for depression advocate using a stepped care model of treatment as displayed in figure 1. The stepped care model aims to ensure that individuals receive the least restrictive treatment and that treatment is self-correcting. Individuals should therefore initially start at lower treatment steps, if these interventions are unsuccessful or declined then they can be moved up to more intensive interventions.

Figure 3 - The stepped-care model. From NICE clinical guideline 90, page 15-16.

| Focus of the intervention | Nature of the intervention |
|--|--|
| STEP 4: Severe and complex ^[a] depression; risk to life; severe self-neglect | Medication, high-intensity psychological interventions, electroconvulsive therapy, crisis service, combined treatments, multiprofessional and inpatient care |
| STEP 3: Persistent subthreshold depressive symptoms or mild to moderate depression with inadequate response to initial interventions; moderate and severe depression | Medication, high-intensity psychological interventions, combined treatments, collaborative care ^[b] and referral for further assessment and interventions |
| STEP 2: Persistent subthreshold depressive symptoms; mild to moderate depression | Low-intensity psychosocial interventions, psychological interventions, medication and referral for further assessment and interventions |
| STEP 1: All known and suspected presentations of depression | Assessment, support, psychoeducation, active monitoring and referral for further assessment and interventions |
| ^[a] Complex depression includes depression that shows an inadequate response to multiple treatments, is complicated by psychotic symptoms, and/or is associated with significant psychiatric comorbidity or psychosocial factors ^[b] Only for depression where the person also has a chronic physical health problem and associated functional impairment (see 'Depression in adults with a chronic physical health problem: treatment and management' [NICE clinical guideline 91]). | |

NICE advocate the use of the following psychological interventions for individuals with depression: CBT, interpersonal therapy (IPT), behavioural activation (BA) and behavioural couples therapy.

1.18 Evidence base for treating mental health conditions in LTC patients

Spurgeon et al (2005) examined the implications of a 8 week CBT based group intervention. They ran groups for patients who: frequently attended GP surgeries, had diabetes, had hypertension or had asthma. Compared to controls all groups showed a significant improvement in psychological wellbeing and a significant reduction in uptake of primary and secondary care services following the intervention. The effects were seen more predominantly for the frequent attendees and patients with hypertension (which has a more established psychological component), patients with diabetes only showed improvements on anxiety scores. However, more recently Lamers and colleagues (2010) evaluated the effectiveness of a nurse led minimal psychological intervention (MPI) in older adults (60 years and above) with individuals with depression and type II diabetes or COPD. They found that at a 9 month post intervention follow up patients receiving the MPI had significantly fewer depressive symptoms than the usual care control group. In addition the MPI diabetic patients rated themselves as having a better QoL than diabetic controls.

Looking at specific conditions there is some evidence that psychological interventions are useful for individuals with COPD and co-morbid mental health problems. Howard et al (2010) implemented a CBT based intervention for individuals with COPD and found significant reductions in anxiety and depression. Furthermore they identified and decreased: health care use, A&E attendance and admittance and pharmacy costs. Similarly Hynninen et al (2010) conducted a small RCT (n=51) comparing CBT versus enhanced standard care for COPD patients with “clinically significant” anxiety and depression. They observed a significant improvement in anxiety and depression scores for the CBT group, which was maintained at 8 months follow up. However, they did not find an associated improvement in sleep and health status.

A number of studies have examined the effectiveness of psychological interventions for individuals with co-morbid cardiac conditions. Berkman et al (2003) found greater improvements in psychosocial outcomes at 6 months in myocardial infarction (MI) patients treated with CBT supplemented with an SSRI anti-depressant compared to treatment as usual. However, a significant difference in physical health

outcomes at a later follow-up (mean 29 months) was not observed. A Cochrane review of psychological treatments for coronary heart disease (CHD) (Rees et al., 2004) concluded that psychological interventions showed no evidence of effect on total or cardiac mortality. However, it was noted that the poor quality of the studies and identified publication bias may weaken the reliability of these findings.

Looking at studies examining chronic pain, Chiesa and Serretti (2011) reviewed research looking at the effectiveness of mindfulness based interventions (MBIs). The preliminary results showed a reduction of pain symptoms and improvement of depressive symptoms in patients. However, most of the studies reviewed were limited in design (e.g. small sample sizes and lack of randomisation), suggesting a need for better quality investigations. Huggins et al (2012) studied individual with HIV and chronic pain who undertook a CBT intervention. They found increases in pain acceptance were associated with decreased levels of pain anxiety and decreases in pain related impairment following treatment. Migliorini et al (2011) used a multiple case study approach to determine the acceptability of a CBT and positive-psychology based online treatment for individuals with spinal cord injury and depression or depression and anxiety. They reported that all participants showed some positive improvements and found the program to be acceptable.

Overall there is currently emerging research suggesting that psychological interventions may have beneficial effects in reducing psychological symptoms for individuals with LTC and anxiety and/or depression. Whether they have additional benefits in terms of physical health and financial implications is still unclear. Well-powered high quality randomised studies and reviews are necessary to clarify the wider effects of psychological interventions and whether this is mediated by the physical health condition.

1.19 NICE guidance for treating co-morbid depression and LTC

The research base described here has increased awareness of the necessity to identify and intervene effectively with co-morbid psychological problems in individuals with LTCs. In line with this NICE produced guidance to treating co-morbid depression and physical health problems in 2009. Similar to the depression guidance a stepped

care approach was advocated. For mild to moderate depression or persistent sub-threshold symptomology the first intervention should be: structured group physical activity programmes, group based peer support, individual CBT based guided self help or computerised CBT (CCBT). The NICE guidelines suggest that peer support groups should be “*delivered to groups of patients with a shared chronic physical health problem*”. For individuals who do not find the above interventions helpful or who present with moderate depression they suggest considering the use of: an antidepressant, group based CBT, individual CBT or behavioural couples therapy. Individuals who present with severe depression and a chronic physical health problem should be considered for a combination of individual CBT and an antidepressant.

1.20 Development of the Wellbeing Group for People with Long-Term Health Conditions and Mild to Moderate Anxiety and Depression (Wellbeing group)

One of the LTC/MUS pathfinders developments in Southwark was the creation of a step 2 group intervention for individuals with LTC and anxiety and depression (the Wellbeing group). This group was created by Professor Andre Tylee (King’s College London) and Dr Sharon Chambers (North East Team Leader in Southwark IAPT). Initially the group was targeted for individuals with depression and a LTC, which is reflected in the course materials and topics, however during the pilot stage the inclusion criteria was expanded to include individuals with general anxiety. As the group is for individuals with varying LTC and depression and/or anxiety it attempts to work transdiagnostically. To develop the protocol the group leaders continually gathered and integrated service user feedback to enhance the effectiveness and acceptability of the group. At the time of this project four groups had been run in Southwark, three pilot groups and one treatment group.

1.21 Structure of the group

The Wellbeing group consists of seven 2 hourly sessions, one introduction session and six treatment sessions with an individual review in the final session. The treatment sessions involve a combination of: psychoeducation, CBT, relaxation

training, mindfulness strategies, peer support and behavioural activation. Over the six weeks five main topics are covered: importance of self care, adjusting activities, improving sleep, managing activities and the role of thinking patterns.

1.22 Group participants

Participants were invited to attend the Wellbeing group if they had a medically diagnosed LTC and presented with current sub-threshold to moderate symptoms of depression and/or anxiety. Patients presenting primarily with specific anxiety disorders or more severe mental illnesses were not invited to attend the group. Appendix 1 outlines the Wellbeing group inclusion and exclusion criteria.

1.23 Aims of the study

This study aims to assess the effectiveness of the Wellbeing group through the analysis of clinical measures used to assess: psychological wellbeing, social functioning and quality of life. In addition this study aims to examine the service user feedback to aid development of the group and determine the acceptability of the group.

2. Method

2.1 Procedure

Clinical governance approval was received from the South London and Maudsley Mood, Anxiety and Personality audit committee prior to commencing data extraction and analysis. Following this the relevant demographic and outcomes data for groups 3 and 4 were extracted from a Microsoft excel database. The information for groups 1 and 2 was gathered from IAPTus, a secure online psychotherapy patient management system. Additional data that was not on IAPTus was gathered from the original paper copies of the measures. All relevant data was entered onto an excel spreadsheet.

2.2 Data checking

Approximately 10% of the of data items on the excel database were checked against the IAPTus database to check for data entry errors.

2.3 Confidentiality

The data was stored on a password protected Microsoft excel spreadsheet. To ensure confidentiality the individuals were coded by their IAPTus reference numbers. The spreadsheet was only stored on a SLAM computer folder and on an encrypted iron key.

2.4 Participants

The participants were selected from the list of individuals who had attended the Wellbeing group. Only individuals who had attended at least half of the group sessions were included in the analysis, non-completers were not included in the analysis. 12 individuals were invited to attend the group but were not included in the analysis because they either failed to engage with the group or they did not complete one of the first four groups.

2.5 Measures

All measures were collected prior to this service evaluation project. The Patient Health Questionnaire 9 (PHQ-9), The Generalized Anxiety Disorder 7 (GAD-7) and Work and Social Adjustment Scale (WSAS) were collected weekly during the group. In addition the Euroqol was collected at 3 points, pre treatment, mid treatment and post treatment.

2.5.1 Patient Health Questionnaire 9 (PHQ-9)

The PHQ-9 (Kroenke et al., 2001) is a brief questionnaire which scores each of the nine DSM-IV areas of depression in terms of frequency ranging from “0” not at all to “3” nearly every day. Higher PHQ-9 scores are hypothesised to reflect more severe depressive episodes. Kroenke et al (2001) found that a PHQ-9 score ≥ 10 demonstrated 88% sensitivity and 88% specificity for major depression. Similarly Arroll et al (2010) found the sensitivity and specificity in a primary care population to be 74% and 91%, respectively. Furthermore research has suggested that the PHQ-9 scores are not confounded by medical condition (e.g. Kroenke et al., 2001; Ferrando et al., 2007; Lamers et al., 2008), supporting its use with this population. Kroenke et al postulated the following PHQ-9 cut off scores: 5 (mild depression), 10 (moderate depression), 15 (moderately severe depression) and 20 (severe depression). These cut-offs shall be used in this project.

2.5.2 Generalized Anxiety Disorder 7 (GAD-7)

The GAD-7 (Spitzer et al., 2006) is a brief questionnaire designed to screen for and access the severity of GAD. It consists of 7 items which are rated on a four point scale of frequency ranging from “0” not at all to “3” nearly every day. The cut off score of 10 was selected by Spitzer et al to identify “caseness”, with a sensitivity score of 89% and specificity score of 82%. An increase in score was found to be associated with multiple domains of functional impairment. The cut off scores of 5, 10 and 15 were suggested as potentially representing mild, moderate and severe levels of anxiety. These cut-offs shall be used in this project.

2.5.3 Work and Social Adjustment Scale (WSAS)

The WSAS (Marks, 1986) is a self-report measures looking at a patients' perception of functional impairment. It consists of a number of likert scales asking about the degree of functional impact on 5 areas: work, home management, social leisure activities, private leisure activities and family and relationships. Mundt et al (2002) found the measure to demonstrate internal scale consistency from 0.70 to 0.94 and a test-retest correlation of 0.73.

2.5.4 Euroqol

The EuroQol group created the EuroQol measure in 1990 to describe and evaluate health related quality of life. The measure enables individuals to describe their health related state on five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Dolan (1997) used the time trade-off method to create direct valuations for the 42 EuroQol health states. In this study the EuroQol data was transformed into the time trade-off scores (TTO) to enable pre and post analysis. In addition the EuroQol contains a subjective visual analogue scale (VAS). On the VAS individuals rate their current perceived health state from zero (worst imaginable health state) to 100 (best imaginable health state).

2.6 Service User feedback

Qualitative participant feedback was collected weekly for the groups. The during treatment feedback form asked what was helpful from the session, what the individuals would like more of and what could be improved (see appendix 2).

2.7 Statistical Analysis

The demographic data was analysed to give an overview of the demographic characteristics of participants in the Wellbeing group. This primarily consisted of calculating a measure of central tendency and dispersion, or frequency using SPSS Statistics 20. Paired sample t-tests were run using SPSS to look at the differences in pre and post treatment scores for all group completers. This was done for the PHQ-9, GAD-7, WSAS, EuroQol and EuroQol VAS. In addition a crosstabulation was

performed on SPSS to determine the number of individuals meeting the threshold for caseness (≥ 10) for the PHQ-9 and GAD-7.

3. Results

3.1 Demographics of group attendees

30 individuals were invited to attend the Wellbeing group, of these 30, 10 individuals (33%) failed to engage and did not attend the group. Of the 20 individuals who attended the Wellbeing group 18 (90%) completed the group. Of these attendees just over half (55%, $n = 11$) were female. The age of attendees ranged from 22 to 79 years with the mean age of attendees being 55.9 years ($S.D. = 11.92$). The majority (60%, $n = 12$) were referred from their GP. Four individuals self referred to IAPT (20%) and the remaining four (20%) were referred from other services.

Group attendees were referred with a range of presenting physical conditions including: cardiovascular problems, musculoskeletal conditions, breathing problems, diabetes, chronic pain and medically unexplained symptoms. See appendix 3 for a outline of presenting physical conditions. The majority of individuals were referred with one primary physical condition (50%, $n = 10$), a quarter reported 2 conditions (25%, $n = 5$), three individuals reported 3 conditions (15%) and two reported 4 or more conditions (10%).

The mean number of sessions attended was 5.9 ($S.D. = 1.37$, range 4 to 8). Following the group nine individuals (45%) were discharged from IAPT. Of the remaining eleven: six (30%) were stepped up to high intensity individual CBT, three (15%) went to other low intensity groups (Mindfulness Based Cognitive Therapy, Behavioural Activation and Compassion and Relaxation training), one was stepped up to high intensity counselling and the final individual went to low intensity individual Behavioural Activation.

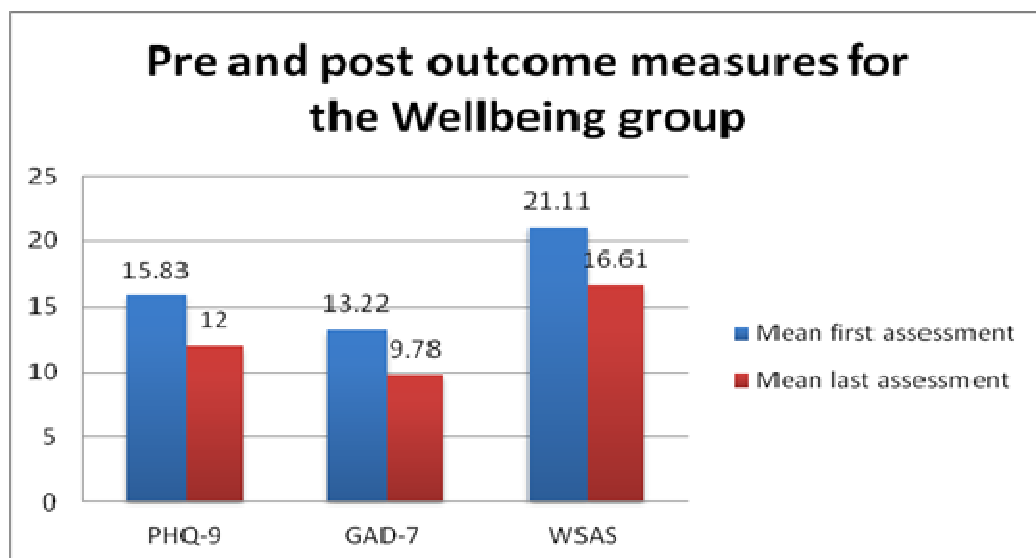
3.2 Clinical Measures for group completers

3.2.1 Overview

The pre and post PHQ-9, GAD-7 and WSAS was collected for all 18 completers. The mean scores of all of these measures showed a statistically significant decrease.

The mean PHQ-9 scores decreased from 15.83 (moderately severe) to 12.00 (moderate). The GAD-7 scores decreased from 13.22 (moderate) to 9.78 (mild). Similarly the WSAS scores decreased from 21.11 to 16.61.

Figure 4 – A graph of the first and last scores for the PHQ-9, GAD-7, and WSAS.



The pre and post EuroQol was collected for all 18 completers and the EuroQol VAS score was gathered for 17 of the 18 completers. A statistically significant change between the mean first EuroQol (0.28) and the mean last EuroQol (0.31) was not observed. The EuroQol VAS score showed a statistically significant increase from 42.47 to 54.12.

Figure 5 – The first, last and difference between the scores for the PHQ-9, GAD-7, WSAS and EuroQol.

| | PHQ-9 (n = 18) | GAD-7 (n = 18) | WSAS (n = 18) | EuroQol (n = 18) | VAS (n=17) |
|-----------------------|-------------------|-------------------|------------------|---------------------|---------------|
| Mean first assessment | 15.83 | 13.22 | 21.11 | 0.28 | 42.47 |
| Mean last assessment | 12.00 | 9.78 | 16.61 | 0.31 | 54.12 |
| Difference | 3.83* | 3.44** | 4.5* | 0.03 | 11.65* |

*Statistically significant difference $p < 0.01$

**Statistically significant difference $p = 0.001$

3.2.2 PHQ-9

The PHQ-9 scores for completers ranged from 7 to 27 at initial assessment and from 1 to 23 at final assessment. The mean PHQ-9 scores decreased from 15.83 (moderately severe) to 12 (moderate) (($t(17) = 3.561$, $p=0.002$), Cohen's $d = 0.57$ (95% CI -0.11, 1.25)). Prior to the intervention, 13 individuals (72.2%) were meeting the clinical caseness cut-off (≥ 10), post intervention this dropped to 9 individuals (50%).

Figure 6 - The pre and post group categorical breakdown on the PHQ-9.

| PHQ-9 score categories | Pre group (n=18) | Post group (n=18) |
|--------------------------------------|------------------|-------------------|
| No Depression (0-4) | 0 (0%) | 2 (11.1%) |
| Mild Depression (5-9) | 5 (27.8%) | 7 (38.9%) |
| Moderate Depression (10-14) | 2 (11.1%) | 2 (11.1%) |
| Moderately Severe Depression (15-19) | 5 (27.8%) | 3 (16.7%) |
| Severe Depression (20+) | 6 (33.3%) | 4 (22.2%) |

Prior to the group nearly two thirds (61.1%, $n = 11$) of completers were scoring in the moderately severe to severe ranges and only 38.9% ($n = 7$) were scoring in the mild to moderate ranges. By the last session this had reversed so that 38.9% of completers ($n = 7$) were scoring in the moderately severe to severe ranges and 61.1% ($n = 11$) were scoring in the mild to moderate range.

On average completers who initially scored above the clinical caseness cut-off (≥ 10) showed a larger decrease in their PHQ-9 scores across the intervention (4.08 points, S.D. = 5.24) compared to those initially scoring below the clinical caseness cut-off (3.2 points, S.D. = 2.38), although this difference was not statistically significant.

3.2.3 GAD-7

The GAD-7 scores for completers ranged from 4 to 20 at initial assessment and from 0 to 20 at final assessment. The mean GAD-7 scores decrease from 13.22 (moderate) to 9.78 (mild) (($t(17) = 3.792$, $p=0.001$), Cohen's $d = 0.56$ (95% CI -0.12, 1.24)). The percentage of cases reaching the cut-off for caseness (≥ 10) fell from 83.33% ($n=15$) to 50% ($n=9$). Prior to the group nearly half of completers (44.4%, n

= 8) were scoring in the severe anxiety range, following the group this figure fell to just over a quarter of completers (27.8%, n = 5).

Completers initially scoring above the cut-off (≥ 10) did not show a noticeable difference in score change (mean = 3.33, S.D. = 1.15) compared to those scoring below the cut-off (mean = 3.47, S.D. = 4.22).

Figure 7 - The pre and post group categorical breakdown on the GAD-7.

| GAD-7 score categories | Pre group (n=18) | Post group (n=18) |
|--------------------------|------------------|-------------------|
| No Anxiety (0-4) | 1 (5.6%) | 5 (27.8%) |
| Mild Anxiety (5-9) | 2 (11.1%) | 4 (22.2%) |
| Moderate Anxiety (10-14) | 7 (38.9%) | 4 (22.2%) |
| Severe Anxiety (15+) | 8 (44.4%) | 5 (27.8%) |

3.2.4 WSAS

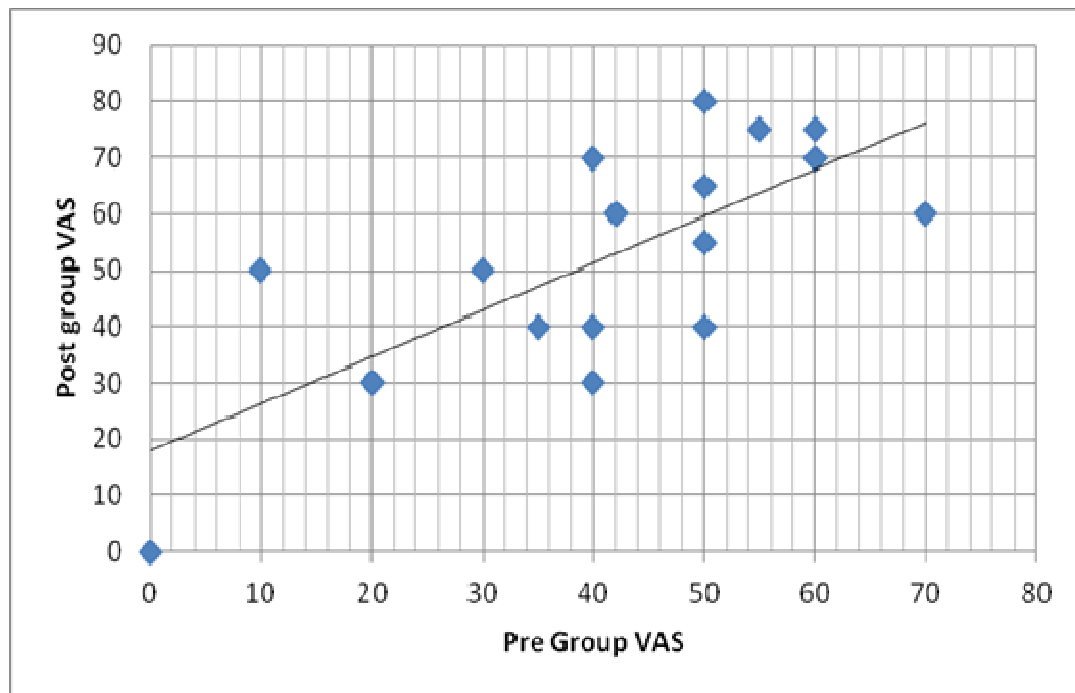
The WSAS scores for completers ranged from 6 to 37 at initial assessment and from 2 to 31 at final assessment. The mean WSAS scores decreased from 21.11 to 16.61 (($t(17) = 2.532$, $p=0.021$), Cohen's $d = 0.46$ (95% CI -0.22, 1.14)).

3.2.5 EuroQol

The mean EuroQol scores did not show a statistically significant change between the mean first EuroQol (0.28) and the mean last EuroQol (0.31) (($t(17) = -.418$, $p=0.681$), Cohen's $d = -0.08$ (95% CI -0.75, 0.59)).

In addition there was pre and post data for 17 of the 18 completers on the VAS. The mean pre treatment VAS was 42.47 (S.D. = 18.79), the mean post treatment VAS was 54.12 (S.D. = 20.93). This change in scores was statistically significant (($t(16) = -3.335$, $p=0.004$), Cohen's $d = -0.58$ (95% CI -1.28, 0.12)).

Figure 8 – A graph displaying the pre and post group VAS scores.



3.3 Qualitative feedback

To help summarise the anonymous qualitative feedback, the forms were collated across the groups and into overarching themes by the primary researcher, these themes were then reviewed with a clinical supervisor. Five themes were found for the aspects that completers found helpful and three were found relating to areas that the group could be improved.

3.3.1 Feedback about helpful aspects of the group

Five key themes were extracted relating to the aspects of the group that the attendees found helpful. One theme related to improving their understanding about depression. This included learning about the symptoms of depression, factors which impact on mood (for example social isolation) and thinking about practical strategies to manage low mood. A second theme focused on group support from others experiencing similar problems. Completers reported enjoying being with others with similar problems, being able to share their problems but also to listen to others problems and coping strategies. A third positive theme was found around the inclusion of Mindfulness components and relaxation exercises. A fourth theme suggested that the

completers found the group atmosphere helpful. For example completers talked about the “warm manner of staff” and “non-judgemental” nature of the group. The final theme was around the psychoeducation components and discussion of practical strategies. Completers reported finding the following psychoeducation components helpful: sleep, pain and diet and nutrition.

3.3.2 Feedback about potential areas of improvement

Three key themes were extracted relating to potential areas of improvement. One theme focused on practical suggestions relating to the group structure. For example completers asked for: longer sessions, more sessions, changes to the physical environment, having more group participants, incorporating music into the relaxation practice and having more one-to-one time. A second theme was found relating to increasing the amount of time spent on topics and exercises already in the group program. In particular there were requests for more mindfulness and relaxation exercises. The final theme reflected the wish for including topics not currently in the group program. For example completers asked for: specific diet and food advice, side effects of medication and one completer requested a space to focus on diabetes.

4. Discussion

The aim of this project was to review the effectiveness of a Wellbeing group developed for adults with LTC and co-morbid anxiety and/or depression. The results showed that completers of the Wellbeing group demonstrated statistically significant decreases in clinical scores on measures of depression (PHQ-9), anxiety (GAD-7) and work and social functioning (WSAS). A medium effect size was observed for all of the above measures (using Cohen's 1988 cut off points). Although no difference was observed on a measure of health status (Euroqol) there was an observed increase in subjective health state as measured by the Euroqol VAS. These results are in line with previous findings that psychological interventions can have a positive impact on anxiety and depression in patients with co-morbid LTCs but that it is less clear whether they impact on physical wellbeing. In addition the group received positive qualitative feedback from attendees suggesting that it may be an acceptable intervention.

4.1 Clinical outcomes

4.1.1 Depressive severity

As described earlier the Wellbeing group is a step 2 intervention for individuals with mild to moderate depression and or anxiety. Although this group was aimed at mild to moderately depressed individuals the mean pre-treatment PHQ-9 score for the Wellbeing participants fell within the moderately severe range (16.15), with nearly two thirds of completers (65%) being classified as moderately severe or severe at the start of the intervention. This highlights that many attendees may be presenting with more severe and potentially more complex depressive episodes than initially thought. As NICE guidance recommends a broader range of step 3 and 4 interventions for individuals presenting with moderate or severe depression one might expect to observe poorer outcomes for this group of individuals when attending a step 2 intervention compared to participants with milder depression. Interestingly this effect was not observed, in contrast individuals in the moderately severe and severe PHQ-9 categories showed slightly larger improvements on the PHQ-9 versus those

scoring in the mild and moderate categories (although this did not reach statistical significance). This suggests that the Wellbeing group may be beneficial at decreasing depression scores for adults reporting mild through to severe PHQ-9 scores.

In this project only the PHQ-9 was used to rate severity of depression. Although the PHQ-9 demonstrates good sensitivity and specificity for diagnosing depression it is a self-report measure and as a result is susceptible to a range of self-report biases, which makes it more difficult to determine the reliability of the severity ratings. To test whether the Wellbeing group is truly beneficial for moderate to severe depressive presentations it would be useful to measure depression severity using a range of self-report and clinician rated tools. This was not within the remit of this project however it could be explored in future groups to help determine for whom the intervention is most beneficial.

4.1.2 Ratings of anxiety

As the Wellbeing group was initially developed for individuals with LTC and depression its content primarily focuses on understanding and treating low mood rather than anxiety. Currently there are no NICE guidelines on treating anxiety for individuals with LTCs. As depression and anxiety are frequently co-occurring it is important to understand how best to support individuals presenting with anxiety and whether this format of intervention works as well for symptoms of anxiety as it does for symptoms of depression. This analysis demonstrated similar statistically significant decreases on the PHQ-9 and GAD-7 and similar medium effect sizes, suggesting that the Wellbeing group is effective at decreasing self-reported symptoms of both depression and anxiety.

As the program does not contain specific anxiety information and strategies it would be interesting to understand more about which components of the treatment are helpful for individuals presenting predominantly with anxiety versus depression. There are a number of components that could hypothetically be affecting anxiety scores either as standalone topics or in combination with other group factors. For example learning basic CBT skills and relaxation strategies in the context of a

supportive group may be more useful than either component alone. As this is not a manualised intervention understanding the key effective components could enable the group to be modified slightly depending on whether group members are presenting predominantly with depression or anxiety.

4.1.3 Health Related Quality of Life

In the analysis no change was seen on health status, as measured by the Euroqol, although a change was found for subjective perceived health, as measured by the Euroqol VAS. There appears to be a strong relationship between depression and a number of behaviours which can have a negative impact on an individuals health and wellbeing for example decreased medication compliance, poorer self care and less physical activity (Das-Munchi et al., 2007; DiMatteo et al., 2000; Gehi et al., 2005; Theofilou, 2013; Vamos et al., 2009; Whooley et al., 2008). Therefore one might expect that an intervention aimed at reducing depressive symptoms may also lead to some improvements in physical health as a result of changing unhelpful behavioural patterns. However, the evidence for this has been mixed (e.g. Rees et al., 2004; Howard et al., 2010). In this analysis it is unclear whether this lack of change reflects a true lack of change in health related quality of life or whether this is due to problems with the design of the group analysis. One potential problem with the design is the lack of follow up assessment. The Wellbeing group consists of 6 weekly treatment sessions, this is unlikely to be a long enough time period to see changes in health related quality of life secondary to mood improvements. Collecting follow-up data could determine whether the Wellbeing group leads to longer term health related improvements. Another possibility is that the EuroQol may not be sensitive to detecting the effects of this intervention. The Euroqol consists of 5 questions assessing different areas of functioning, some of which are potentially static and unlikely to change following a psychosocial intervention (for example level of mobility). The focus of this intervention is not predominantly on changing health-related behaviours (e.g. smoking cessation) but rather on increasing wellbeing. The Euroqol VAS or specific wellbeing measures may be more helpful in assessing wellbeing outcomes because they enable individuals to take into consideration their overall subjective perceived health, as opposed to specific pre-determined areas.

4.2 Qualitative participant feedback

In addition to measuring quantitative clinical outcomes this project aimed to review the service user feedback to aid the development of the group and determine the acceptability of the group. Despite the anonymity of the service user feedback, it was collected by the course facilitators and it is possible that the service users may have consciously or unconsciously responded more positively as a result. To help minimise this in future groups the feedback could be collected via staff not associated with the group.

4.2.1 The content of the group

The qualitative feedback suggested that the completers found a number of aspects of the group content helpful. These were: understanding about what impacts our mood and how to manage low mood, the mindfulness and relaxation information and exercises, psychoeducation and discussion of practical strategies focused on diet and exercise, sleep and pain. When asked how to improve the group, none of the feedback forms suggested any of the current topics to be unhelpful or necessary to exclude. Completers expressed a wish to have more time devoted to topics and exercises which are already in the group program (e.g. mindfulness and relaxation) and some completers asked for specific topics to be added (including the side effects of medication and diabetes specific information).

4.2.2 Areas for potential improvement

As noted in the above section some completers requested specific topics to be added to the program. With any short term intervention it is necessary to keep in mind its aims and related to this the most useful components to include. Due to the multi-disorder nature of the group it is not within the remit of this group to focus on disorder specific information. This may be something that could be incorporated through offering leaflets on specific disorders or through directing individuals to specialist medical services for further information. Incorporating other topics would result in either less time dedicated to current topics or the group being extended in length. When thinking about whether to increase the length of the group it is

important to consider the cost-benefit ratio of this, is the benefit of including another session enough to justify the cost of the clinicians time. This will invariably depend on the available resources of the service and the group facilitator.

Other areas for potential improvement focused on practical aspects such as the room which the group was set in, the number of sessions, the number of group participants, incorporating music into the relaxation practice and having more one-to-one time. Some of these suggestions could be incorporated with minimal cost or time. As the pilot groups were constantly recording service user feedback and integrating it into the program structure the feedback varied slightly between the groups. For example it was only the first pilot group who requested the group room to change, following this feedback the group was run in a different room. This demonstrates that service user feedback was genuinely being valued and incorporated where possible.

4.2.3 Acceptability of the group format

Completers reported finding the group support from others experiencing similar problems and the group atmosphere helpful. In addition no-one reported wishing to have the intervention as a one-to-one format, and only one person reported wanting more one-to-one time. This feedback suggests that the group format may be an acceptable way of running the intervention.

4.3 The structure of the Wellbeing group and NICE guidance

The NICE guidance regarding the treatment of depression in the context of LTC advocates low intensity psychosocial and psychological interventions for individuals with persistent sub threshold depressive symptoms or mild to moderate depression. The Wellbeing group appears to be a potentially beneficial low intensity approach which has shown a positive impact on self-ratings of depression, anxiety and work and social adjustment. Additionally it is in line with the majority of the NICE suggestions regarding the layout of low intensity groups. For example the qualitative feedback shows that the group “*focuses on sharing experiences and feelings associated with having a chronic physical health problem*”, and is supported by

practitioners who “*have knowledge of the patients' chronic physical health problem and its relationship to depression*” (NICE, 2009, p21).

There is however one aspect of the NICE guidance which the Wellbeing group does not follow, NICE advocates that the low intensity group interventions for adults with depression and LTC should be “*delivered to groups... with a common chronic physical health problem*” (NICE, 2009, p21). The Wellbeing group is a multi-disorder group; however it does differentiate between LTCs associated with an observable physical cause (e.g. COPD and diabetes) and medically unexplained symptoms (e.g. fibromyalgia or chronic fatigue syndrome). When the Wellbeing group was initially planned it was designed to be specific for individuals with cardiac problems, however this group never ran due to the service receiving insufficient referrals. As a result the group inclusion criteria was expanded to cover a broad range of LTCs. It is therefore likely that in an IAPT setting a disorder specific group could lead to individuals with rarer LTCs experiencing either long waiting times or being unable to attend a group due to the lack of participants. A multi-disorder LTC group may be more advantageous in a busy primary care service such as IAPT for a number of practical reasons. A multi-disorder group may be more time and cost efficient as group participants are likely to be identified quicker, leading to potentially shorter waiting times. Furthermore a multi-disorder group may be more inclusive as it enables all individuals with a LTC and anxiety and or depression the equal opportunity to attend the group. One could argue that potentially a key component of the intervention is the ability to share similar experiences which may differ across different diagnoses. However, the qualitative service user feedback highlighted that participants did find it helpful to share experiences with others experiencing similar problems, despite the fact that groups included a range of presenting physical conditions.

4.4 Limitations of the current project

Readers must be cautious when looking at the statistical analysis completed for this study as it only included 20 participants who had completed the Wellbeing group. It is difficult to determine whether this sample of 20 completers accurately portrays the population being studied and as a result it would be useful to continue to monitor the

outcomes as future groups are run. However, it is encouraging to have observed statistically significant changes and medium effect sizes for three of the clinical outcome measures despite the small number of participants.

Due to the limited sample size this project has not been able to explore for whom the Wellbeing group is most beneficial. As discussed earlier two potentially useful areas to further explore would be whether the group has differing outcomes for individuals entering with more severe levels of depression and those entering reporting predominately anxiety problems. Understanding the individual variables which influence intervention outcomes can help to maximise the appropriateness of referrals and potentially decrease the number of individuals not engaging with the group.

In addition currently the key active components of the Wellbeing group are unclear and have not been investigated due to the small number of groups run and attendees. The main elements of the Wellbeing group are: psychoeducation, CBT, relaxation training, mindfulness strategies, peer support and behavioural activation. Understanding which aspects, and in which combination, lead to the most beneficial outcomes will be useful to optimise the impact of the group. Furthermore since the Wellbeing group was created a Mindfulness Based Stress Reduction (MBSR) group has also been set up in Southwark IAPT for individuals with LTCs. It would be useful to compare these groups firstly to determine whether they result in equivalent outcomes but additionally this could help us to understand the components leading to reductions in clinical scores which are shared versus different across the groups.

The Wellbeing group demonstrated a very low attrition rate (5% $n = 1$) across the four groups however a third of invitees ($n = 10$) failed to engage with the intervention. In this project failure to engage was classified as declining the group, not responding to the invitation or withdrawing from the group prior to the first session. It would be useful to investigate the reasons that individuals did not engage to determine whether this reflects individual factors (e.g. not wishing to attend a group), practical factors (e.g. timing or location of the group) or Wellbeing group specific factors (e.g. its layout and content). Understanding this may help to

maximise the inclusiveness of the group and may ensure that individuals are receiving the most appropriate intervention.

As discussed above the Wellbeing group is a multi-disorder group. Although disorder specific groups have been advocated by NICE the Wellbeing multi-disorder group has shown positive changes in a number of clinical outcomes. However it would be useful to clarify whether disorder specific or multi-disorder groups lead to differing clinical outcomes. It is also possible that disorder specific groups may work better for certain conditions and non-specific for other. To determine the most effective way to implement the LTC groups, ideally you would want to complete a controlled comparison study comparing disorder specific and non-specific groups utilising the same protocol and assessment measures. This could be problematic in an IAPT service due to the known practical difficulties of establishing disorder specific groups. Perhaps therefore the Wellbeing group program could be shared with services more likely able to run disorder specific group (e.g. psychology teams situated in physical health services). This could enable the comparisons of outcomes following disorder specific versus non-specific groups.

4.5 Dissemination of the evaluation

Following the statistical analysis the research findings were disseminated to the Southwark IAPT service through a presentation at a team away day. This presentation summarised the outcome measures and the service user feedback. In addition a finalised version of this evaluation will be sent to Dr Sharon Chambers (group co-creator) to enable it to be shared with professionals interested in learning more about the Wellbeing group.

4.6 Conclusion

This evaluation found that the Wellbeing group was an effective intervention for decreasing self-report levels of depression (PHQ-9), anxiety (GAD-7) and work and social functioning (WSAS) for the 20 completers. Changes were not observed on a measure of health status (EuroQol) however there was an observed increase in subjective health state as measured by the EuroQol VAS. These findings are in line

with previous research looking at psychological interventions for individuals with LTC and co-morbid anxiety and/or depression. In addition the service user feedback and low attrition rates support the idea that this may be an acceptable intervention. This project also recognised a number of limitations in terms of its methodological design. Furthermore a number of potential future areas for research are highlighted which could enhance our understanding of the mediators of change and therefore how to maximise the effectiveness of the group. In summary the Wellbeing group appears to be a useful low intensity intervention for service users with LTCs and mild to moderate anxiety and/or depression, however there remains scope for further improvement in the research and validation of the Wellbeing group.

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6. Appendices

6.1 Appendix 1 – Referral flyer for the Wellbeing group

Southwark Psychological Therapies Service:
***Wellbeing group for people with Long Term Health Conditions
and mild to moderate anxiety or depression***

FOR SPTS TEAM LEADERS (when assessing/screening when considering for **LTC group**)

The group provides opportunities for people with long term conditions to learn how to manage low mood and stress, worsened due to their medical condition. They will gain psycho-education, peer support from other group participants, and some self help guidance from facilitators with general practice and psychological experience

Most helpful for:

- Medically diagnosed Long Term Condition(LTCs). e.g. CHD, COPD, Asthma, hypertension, diabetes, pain directly associated with organic medical condition, including OA, Rh.Arthritis, actual back injury, actual degenerative condition of spine, but not for chronic pain, fibromyalgia, etc)
- Current mild/sub-threshold to moderate symptoms of depression and/or anxiety
- Mobile to be able to physically able to attend sessions
- English speaking / reading levels enough to participate

Exclusion:

- Medically unexplained symptoms, includes chronic pain with unknown origin/non-organic basis, Fibromyalgia, IBS.
- People for whom the *main problem* is OCD, panic disorder or PTSD, severe borderline PD or severe treatment resistant depression or anxiety
- Severe Mental Illness e.g. schizophrenia, bi-polar depression etc
- Current suicidal intent/DSH, or risk to others
- Current illicit drug use or severe alcohol use
- Severe LTC making attendance difficult

In order to benefit from this group, participants need to:

- Commit to attend weekly sessions on Monday afternoons at Guys Hospital York Clinic.
- Be able and willing to participate in a group, share, listen and interact with other group members

FEEDBACK SHEET

In order to help us to develop this group to your needs and for future groups, we would really value your thoughts about how you found today's session.

Please write one or two sentences at most on the following sections on this sheet:

1/ What I found most helpful from today's session was.....

What I would like more of is.....

2/ What could be improved upon is.....

(and if you have any thoughts/ ideas on this please write down here also)

6.3 Appendix 3 – List of presenting physical health conditions for included participants

| |
|-------------------------------|
| • Multiple Sclerosis |
| • Diabetes |
| • Asthma |
| • Spinal injury / back pain |
| • Chest pain (NOS) |
| • Cardiac (heart failure) |
| • Diabetes, cancer |
| • Fibromyalgia |
| • Arthritis |
| • Emphysema |
| • Chronic pain (knee surgery) |

Volume I

**SYSTEMATIC LITERATURE REVIEW,
MAIN RESEARCH PROJECT
AND
SERVICE EVALUATION PROJECT**

Alexandra Wretham

Thesis submitted in partial fulfillment of the degree of
Doctorate in Clinical Psychology

Institute of Psychiatry, Psychology and Neuroscience,
King's College London

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Systematic literature review

THE IMPACT OF LIVING OUTSIDE OF
THE BIOLOGICAL FAMILY HOME ON
EXECUTIVE FUNCTIONING
DEVELOPMENT

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King's College London

Supervised by Dr Matt Woolgar

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Abstract

Background

Early life stress and maltreatment has been observed to impact on cognitive development. Executive functioning (EF) processes begin to develop from early infancy and there is emerging evidence that early life maltreatment might influence their development. Children who have been removed from the family home and are in care or adopted are particularly likely to have experienced maltreatment and early life disruption.

Objectives

This systematic review aimed to extract and synthesis data relating to whether looked after (LAC), adopted and post-institutionalised (PI) children show deficits on tests of EF. A secondary aim was to compare across these sub-groups and identify similarities or differences in EF abilities.

Methods

A systematic search of three electronic databases was completed: Ovid, Web of Knowledge and the Cochrane library. Of the 895 records that were screened, 30 studies were identified to meet the selection criteria and included in this review.

Results

The majority of studies examined EF in PI children (n = 24). In this population parental reported EF difficulties were consistently observed and associated with duration of institutionalisation. Poorer performance was also observed on several laboratory tasks of EF. LAC and adopted studies eluded to potential EF problems, however comparisons were difficult due to the limited number of studies and range of tasks used. Comparisons across populations were not possible due to the use of differing tasks and small number of identified studies.

Conclusion

This review provides evidence for the impact of environmental and social factors on EF development. It suggests that PI children may be more likely to exhibit EF

difficulties, particularly if they are removed from institutions at older ages. Furthermore the current evidence for LAC and adopted children, taken alongside the known impact of childhood maltreatment, suggests that these populations may be at higher risk for exhibiting EF difficulties.

1. Introduction

Executive functioning (EF) is an umbrella term which encompasses a wide range of cognitive processes that govern purposeful goal-directed behaviour and how we respond to novel situations (Hughes, 2011). The term EF is often used interchangeably with frontal lobe functioning due to the hypothesised importance of the frontal cortex in completing EF tasks (Elliot, 2003). EF processes include “*anticipation, goal selection, planning, initiation of activity, self-regulation, mental flexibility, deployment of attention, and utilization of feedback.*” (Anderson, 2002, p71). In addition to the aforementioned skills, the EFs have been implicated in playing a pertinent role in several aspects of a child’s social and academic development for example the development of pragmatic skills (Blain-Briere, Bouchard & Bigras, 2014), reading skills (Cartwright, 2012) and mathematical achievement (Bull, Espy, & Wiebe 2008).

Research from the last 25 years has indicated that the EF are a group of ‘*separable but related functions*’ (Miyake, Friedman, Emerson, Witzki, Howerter & Wager, 2000). These skills do not develop as one unitary process, but rather they appear to emerge at different stages from infancy to early adulthood following differing developmental trajectories (Best & Miller, 2010; Blakemore & Choudhury, 2006; Carlson, 2005; Cuevas & Bell, 2010; Dawson & Guare, 2010; Garon, Bryson, & Smith, 2008; Hoehl, Reid, Mooney & Striano, 2008; Hughes, 2011). For example, during early to middle childhood processes such as working memory and inhibition appear to develop earlier than cognitive flexibility (Davidson, Amso, Anderson, & Diamond, 2006). Anderson, Anderson, Northam, Jacobs & Catroppa (2001) suggested that the maturation of EF is rapid throughout early and middle childhood but that it slows considerably during late childhood and adolescence. They found that although improvements were seen across problem solving skills and planning abilities, the most significant EF development in late childhood and adolescence occurred in the domain of attentional control–processing speed, with older adolescents displaying greater attentional capacity and faster task completion. This is just a brief demonstration of the complexity in the development of this wide

ranging set of skills, for a comprehensive overview of EF development see Hughes et al (2011).

To ensure accurate goal completion, children and adults are required to implement a number of these diverse EF processes. Difficulties in the application of any of these processes can disrupt task performance and lead to a range of primary and secondary problems. Consider the example of a child preparing their bag for school; this seemingly simple task requires a number of processes that fall into the EF category. The child must be able to initiate the activity, plan what is needed for the following day, keep in mind the multiple required items, check whether they have missed anything and incorporate this information to pack any forgotten items. A disruption in any of these five processes could result in the child failing to complete the task of packing their bag correctly. Alongside day-to-day disruptions in goal-directed behaviour, children with EF deficits have been observed to display a range of difficulties in regulating both their emotions and behaviour (Anderson, 2002). Furthermore scholastically, a relationship has been observed between stronger EF abilities and improved academic performance and learning (Bull et al., 2008; Gathercole, Pickering, Knight, & Stegmann, 2004).

EF deficits have been observed in many clinical and neurodevelopmental conditions including; Phenylketonuria (Diamond, Prevor, Callender & Druin, 1997), Autistic Spectrum Disorder (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009; Ozonoff, Pennington, & Rogers, 1991; Hughes, Russell, & Robbins, 1994) and Attention Deficit Hyperactivity Disorder (Happé, Booth, Charlton, & Hughes, 2006; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). The significance of EF abilities and the impact of EF deficits makes it necessary to understand the factors that may impact on their development. Although EFs have been demonstrated to be highly heritable (Friedman, Miyake, Young, DeFries, Corley & Hewitt, 2008), social and environmental factors have been shown to impact on EF task performance. For example: family social economic status, family structure, parental responsiveness, (Sarsour, Sheridan, Jutte, Nuru-Jeter, Hinshaw, & Boyce, 2011) and the organisation and predictability of family life (Hughes & Ensor, 2009) have been explored as potentially important variables. Furthermore, premature birth and high levels of

prenatal alcohol use are associated with long-term EF problems (Hughes et al., 2011; Mulder, Pitchford, Hagger, & Marlow, 2009).

The detrimental impact of early childhood maltreatment on overall cognitive functioning has been well established through numerous neuropsychological studies and reviews (Carrey, Butter, Persinger & Bialik, 1995; Nolin & Ethier, 2007; De Bellis, Hooper, Spratt & Woolley, 2009; Hart & Rubia, 2012). Moreover, neurobiological studies have shown considerable evidence that extreme stress, such as child abuse and neglect, during developmental sensitive periods can lead to profound and lasting neurobiological changes (Anda, Felitti, Bremner, Walker, Whitfield, Perry, et al., 2006; Chugani, Behen, Muzik, Juhász, Nagy & Chugani, 2001; Hanson, Adluru, Chung, Alexander, Davidson & Pollak, 2013; Hart & Rubia, 2012). With the knowledge that the EFs begin to develop from early infancy it is plausible that early life maladaptive experiences could impact on their development. In line with this a number of studies have reported severe early life psychosocial deprivation to be associated with disruptions in some EF abilities (e.g. Bauer, Hanson, Pierson, Davidson & Pollak, 2009; Bos, Fox, Zeanah & Nelson, 2009; Colvert, Rutter, Kreppner, Beckett, Castle, Groothues, Sonuga-Barke et al., 2008; Merz & McCall, 2011). These studies have predominantly focused on children raised in socially depriving orphanages who were subsequently adopted internationally. Although this level of psychosocial deprivation is atypical, unfortunately a large number of children experience early life disruption or maltreatment. Children who have been removed from the family home and are in care or adopted are particularly likely to have experienced maltreatment and early life disruption. However, to date there is a paucity of research which has examined EF abilities in these population. Due to the lack of research examining EF skills in children who have experienced early disruption or maltreatment this systematic review aims to collate and compare the current research regarding EF abilities in looked after, adopted and post-institutionalised children. The rationale for comparing these three groups is to enable observations across these populations to see whether EF difficulties may exist and to aid thinking about whether this is specific to type or dose of maltreatment.

2. Methods

2.1 Primary outcomes

The primary aim for this analysis is to extract and synthesise relevant data relating to whether looked after, adopted and post-institutionalised children show deficits on tests of EF. In this review the term ‘post-institutionalised’ refers to a children adopted from socially depriving institutions, ‘adopted’ relates to children adopted from non-institutional settings (e.g. foster care or birth family), and ‘looked after’ denotes those children under the care of the state or local authority (e.g. in foster care or group homes). A secondary aim is to be able to compare across these sub-groups and identify similarities or differences in EF abilities.

2.2 Eligibility criteria for inclusion in the review

2.2.1 Participants

Studies were included in this review if they were assessing EF in children and adolescents under the age of 18 years who had experience of being in foster care, orphanages or who were adopted. Studies were not included if all participants were reported to have comorbid diagnoses likely to impact on their EF abilities for example a diagnosis of Fetal Alcohol Syndrome (Rasmussen, 2005), Post Traumatic Stress Disorder (Beers & De Bellis, 2002), Neurodevelopmental disorders (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009) or traumatic brain injury (Lenvin & Hanton, 2005).

2.2.2 Executive functioning measures

To be included in this review studies had to report assessing EF ability using at least one neuropsychological measure, experimental task or validated EF questionnaire. Furthermore outcome data had to be accessible, either reported in the publication or able to access via contacting the authors. Due to the wide range of assessment tools used both standardised and non-standardised measures were included. However, studies which implemented measures without validated normative data were only included if data was presented for a comparison group to enable interpretation.

2.2.3 Study characteristics

Cross sectional studies, cohort studies and assessment studies published in peer review journals were included in this review. Single case studies or series were excluded. Unpublished dissertations were not included. In addition only journals available in English were included.

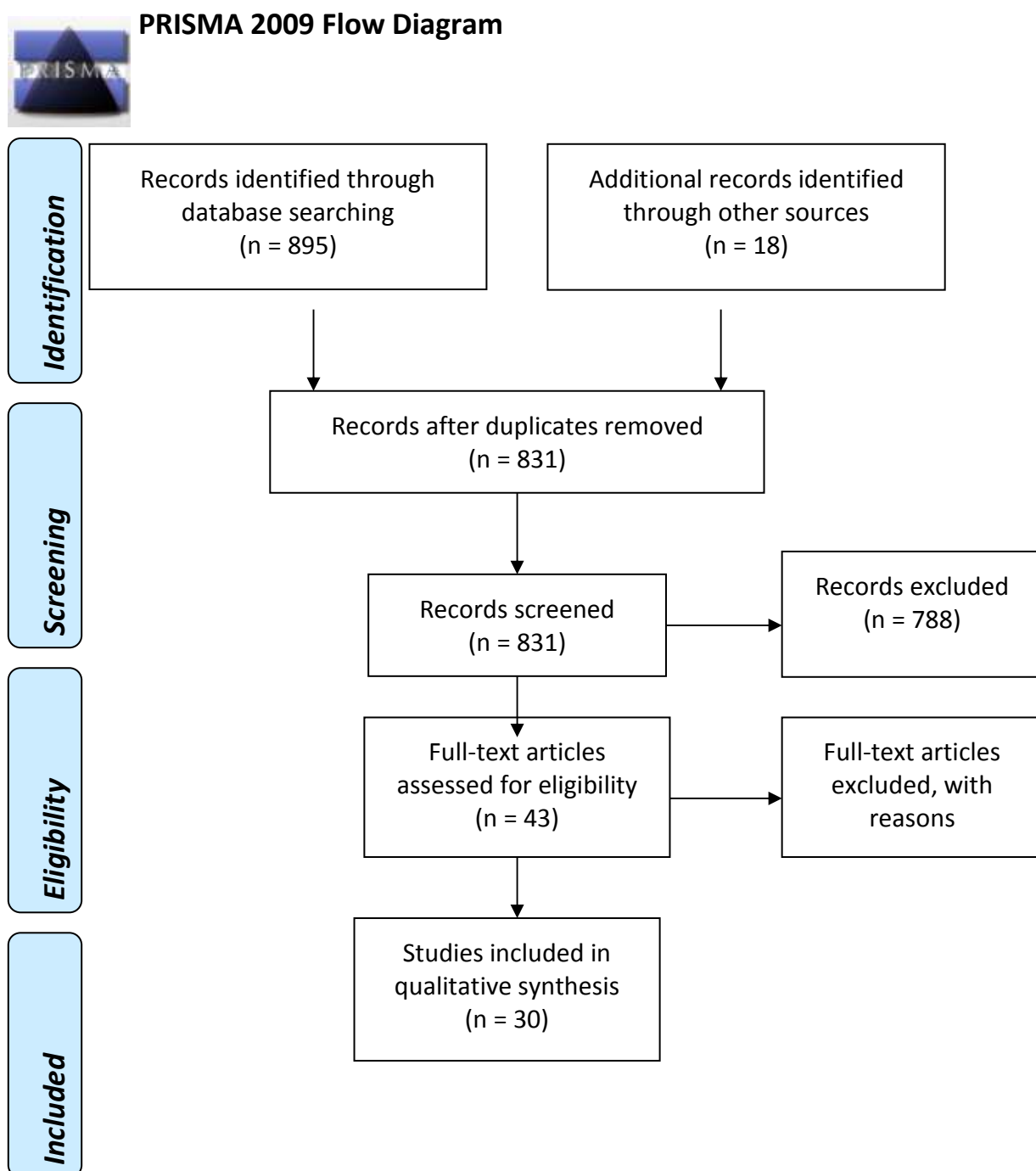
2.3 Identification of studies

To identify studies to be included in this review three electronic database searches were conducted on the 1st April 2015, the searches covered the period up to and including the 1st April 2015. The three electronic databases which were searched were; Ovid, Web of Knowledge and the Cochrane library. For the Ovid search the following databases were selected: Embase, PsychInfo and Medline. A full list of search terms can be found in appendix 1. In addition a hand search was conducted by screening the bibliographies of all papers identified as potentially relevant as well as published reviews in related topics. A search of unpublished 'grey' literature was not conducted.

2.4 Study selection

The first step of selecting appropriate studies was to identify and remove duplicate papers, this was done electronically using the Endnote program and then reviewed by hand (figure 1 displays the PRISMA flow diagram). To identify potentially relevant articles all papers were screened by reviewing the title and journal of publication, if it was unclear whether an article met the inclusion criteria then the abstract was reviewed. Following this 43 journals were identified that potentially met the inclusion criteria. The full texts were downloaded online for these 43 papers through the Kings College London journal subscription, with the exception of 2 papers that were obtained through an inter-library loan system. These texts were reviewed to determine whether the articles met the inclusion criteria and to assess the quality of the articles. This screening process was completed by the primary researcher.

Figure 1 -Displays the PRISMA Flow Diagram for this systematic review.



Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

2.5 Data extraction

Data was extracted by hand from the full texts into an Excel database. The following pieces of information were identified: study design, participant recruitment, participant characteristics, potential confounding variables, assessment tools used to examine EF and the outcomes of assessment.

2.6 Quality assessment of articles

The quality of potential studies was assessed using the Quality Assessment Tool for Quantitative Studies (Effective Public Health Practice Project (EPHPP)). All 30 papers identified as relevant were reviewed using this tool by the primary researcher and classified as strong, moderate or weak. A sub-set of 5 studies were randomly selected and co-rated by a second researcher, inter-rater reliability was assessed using the Kappa statistic.

2.7 Data analysis

The data was initially divided into three categories based on the measures used to assess EF: standardised neuropsychological batteries, experimental tasks and self-report questionnaires. Within these categories the studies were then sorted by the assessed population: looked after, adopted or post-institutionalised children. Within these sub-groups the data relating to EF abilities was extracted, synthesised and summarised. A number of papers reported the neuropsychological profile of participants in the context of imaging studies or broader cognitive or behavioural assessments. These studies were included however only the information relating to EF performance as measured by the aforementioned assessment types was included.

Figure 2- A table of included studies displaying their sample, comparison groups, age range, EF measures used and quality rating

| Study | Study design | Sample | Comparison group | Age | EF Measures | EPHPP Rating |
|--|----------------------------|--|---|---------------------------------|---|--------------|
| Adopted children studies | | | | | | |
| <i>Leve, L. D., et al. (2013). "Using an Adoption Design to Separate Genetic, Prenatal, and Temperament Influences on Toddler Executive Function." Developmental Psychology 49(6): 1045-1057.</i> | Longitudinal | 361 (155 female) | None | Assessed at 9, 18 and 27 months | Experimental tasks: Shape Stroop task, gift delay task | 1 |
| <i>Lewis, E. E., et al. (2007). "The effect of placement instability on adopted children's inhibitory control abilities and oppositional behavior." Developmental Psychology 43(6): 1415-1427.</i> | Cross-sectional comparison | 33 with placement instability (62% female). 42 with 1 stable placement (55% female). | 27 non-adopted (NA) controls (56% female) | 5-6 years | Experimental tasks: Day to night task | 1 |
| <i>Mueller, S. C., et al. (2012). "Incentive effect on inhibitory control in adolescents with early-life stress: An antisaccade study." Child Abuse and Neglect 36(3): 217-225.</i> | Cross-sectional comparison | 17 (10 female) | 29 NA controls (16 females) | Mean 11.3 years (1.9) | Experimental task: incentivised eye saccade task | 1 |
| LAC studies | | | | | | |
| <i>Bucker, J., et al. (2012). "Cognitive impairment in school-aged children with early trauma." Comprehensive Psychiatry 53(6): 758-764.</i> | Cross-sectional comparison | 30 (13 female) | 30 NA control (14 female) | 5-12 years | Experimental task: Wisconsin Card Sort Test (WCST), Continuous Performance Test (CPT) | 1 |
| <i>Pears, K. and P. A. Fisher (2005).</i> | Cross-sectional | 99 (48 female) | 54 NA controls | 3-6 years | Standardised | 1 |

| | | | | | | |
|--|----------------------------|-----------------|----------------------------|------------|--|---|
| "Developmental, cognitive, and neuropsychological functioning in preschool-aged foster children: Associations with prior maltreatment and placement history." <i>Journal of Developmental and Behavioral Pediatrics</i> 26(2): 112-122. | comparison | | (26 female) | | battery: NEPSY (EF domain) | |
| | | | | | Experimental tasks: Stroop task, Card sort task | |
| Pears, K. C., et al. (2010). "Early Elementary School Adjustment of Maltreated Children in Foster Care: The Roles of Inhibitory Control and Caregiver Involvement." <i>Child Development</i> 81(5): 1550-1564. | Cross-sectional comparison | 85 (40 female) | 56 NA controls (26 female) | 3-6 years | Standardised battery: NEPSY (attention/EF domain) | 2 |
| | | | | | Experimental tasks: modified Stroop task, Dimensional change card sort task | |
| | | | | | Questionnaires: Children's behaviour questionnaire. | |
| PI studies | | | | | | |
| Bauer, H., et al. (2009). "Cerebellar Volume and Cognitive Functioning in Children Who Experienced Early Deprivation." <i>Biological Psychiatry</i> 66(12). | Cross-sectional comparison | 31 (16 females) | 30 NA controls (14 female) | 9-11 years | Standardised battery: Cambridge Neuropsychological Test Automated Battery (CANTAB; | 2 |

| | | | | | | |
|---|----------------------------|--|--|------------|---|---|
| | | | | | Cambridge Cognition) IED, SOC, SWM sub-tests | |
| Beckett, C., et al. (2010). "VI. Institutional deprivation, specific cognitive functions, and scholastic achievement: English and Romanian Adoptee (Era) study findings." <i>Monographs of the Society for Research in Child Development</i> 75(1): 125-142. | Cross-sectional comparison | 144 (55% of combined post-institutionalised and internationally adopted groups were female) ^a | 52 adopted from the UK younger than 6months (18 female) pooled with 21 internationally adopted from families | 11 years | Standardised battery: Digit span backwards (WISC-III) Experimental tasks: Tower of London, FAS task. | 1 |
| Behen, M. E., et al. (2008). <i>Incidence of specific absolute neurocognitive impairment in globally intact children with histories of early severe deprivation. Child Neuropsychology</i>, 14(5), 453-469. | Cross-sectional | 85 (47 females) | None | 5-17 years | Experimental tasks: Gordon Diagnostic System (GDS) | 1 |
| Bos, K. J., et al. (2009). "Effects of early psychosocial deprivation on the development of memory and executive function." <i>Frontiers in Behavioral Neuroscience</i> 3. | Cross-sectional comparison | 93 (46 female) | 48 NA controls (23 female) | 8 years | Standardised battery: CANTAB SOC and SWM sub-tests | 1 |
| Bruce, J., et al. (2009). "Disinhibited social behavior among internationally adopted children." <i>Development and Psychopathology</i> 21(01): 157-171. | Cross-sectional comparison | 40 (30 female) | 40 NA controls (30 female). 40 looked after children (30 female) | 6-7 years | Experimental tasks: Go/no go task, 2 delay of gratification tasks | 1 |

| | | | | | | |
|--|---|--|--|--|--|---|
| Cardona, J. F., et al. (2012). "Potential consequences of abandonment in preschool-age: Neuropsychological findings in institutionalized children." Behavioural Neurology 25(4): 291-301. | Cross-sectional comparison | 18 (0 female) | 18 NA controls (0 female) | 7-15 years | Standardised battery: NEUROPSI Attention and Memory Battery. | 1 |
| Chugani, H. T., et al. (2001). Local brain functional activity following early deprivation: a study of postinstitutionalized Romanian orphans. Neuroimage, 14(6), 1290-1301. | Cross-sectional | 10 (4 female) | None | 7-11 years | Experimental tasks: Trails a&b, GDS | 3 |
| Colvert, E., et al. (2008). "Do Theory of Mind and executive function deficits underlie the adverse outcomes associated with profound early deprivation? Findings from the English and Romanian adoptees study." Journal of Abnormal Child Psychology 36(7): 1057-1068. | Cross-sectional comparison and longitudinal | 144 (55% of combined post-institutionalised and internationally adopted groups were female) ^a | 52 adopted from the UK youngers than 6months (18 female). 21 internationally adopted from families | 11 years | Experimental tasks: Stroop | 2 |
| Doom, J. R., et al. (2014). Beyond stimulus deprivation: Iron deficiency and cognitive deficits in postinstitutionalized children. Child development, 85(5), 1805-1812. | Cross-sectional comparison and longitudinal | 55 (29 female) | None | Assessed after adoption and then at mean 3.1 years (0.4) | Experimental tasks: Delay of gratification task, Dimensional Change Card Sort, spin the pots task. | 2 |

| | | | | | | |
|---|----------------------------|---|-----------------------------|---------------------|---|---|
| Eigsti, I. M., et al. (2011). Language and cognitive outcomes in internationally adopted children. Development and Psychopathology, 23(02), 629-646. | Cross-sectional comparison | 46 (23 female) | 24 NA controls (7 female) | 4-13 years | Standardised battery: NEPSY auditory attention Experimental task: Cognitive control task, Go/no-go task, | 2 |
| Eluvathingal, T. J., et al. (2006). "Abnormal brain connectivity in children after early severe socioemotional deprivation: a diffusion tensor imaging study." Pediatrics 117(6): 2093-2100. | Cross-sectional comparison | 7 (5 female) | 7 NA controls (4 female) | Mean 9.7years (2.6) | Experimental tasks: GDS | 2 |
| Groza, V., et al. (2008). Institutionalization, Romanian adoptions and executive functioning. Child and Adolescent Social Work Journal, 25(3), 185-204. | Cross-sectional | 123 internationally adopted children, 81% post-institutionalised (49.6% female) | None | Mean 10 years (1.9) | Questionnaires: Behaviour Rating Inventory of Executive Functioning (BRIEF) parent and teacher versions | 2 |
| Hanson, J. L., et al. (2013). Early neglect is associated with alterations in white matter integrity and cognitive functioning. Child development, 84(5), 1566-1578. | Cross-sectional comparison | 25 ^b | 38 NA controls ^b | 9-14 years | Standardised battery: CANTAB PAL, IED, SOC, and SWM sub-tests | 2 |

| | | | | | | |
|---|----------------------------------|--|--|---|--|---|
| Hostinar, C. E., et al. (2012). "Associations between early life adversity and executive function in children adopted internationally from orphanages." <i>Proceedings of the National Academy of Sciences of the United States of America</i> 109: 17208-17212. | Cross-sectional comparison | 54 (31 females) | 29 NA controls (17 females) | 2.5-4 years | Experimental tasks: DCCS scale, Spin the pots, Delay of gratification | 2 |
| Jacobs, E., et al. (2010). "Developmental and Behavioral Performance of Internationally Adopted Preschoolers: A Pilot Study." <i>Child Psychiatry & Human Development</i> 41(1): 15-29. | Cross-sectional and longitudinal | 37 (25 female) | None | Assessed at adoption and then 4-5 years | Questionnaires: BRIEF-preschool (BRIEF-P) | 2 |
| Loman, M. M., et al. (2013). "The effect of early deprivation on executive attention in middle childhood." <i>Journal of Child Psychology and Psychiatry</i> 54(1): 37-45. | Cross-sectional comparison | 24 (13 female) | 27 NA controls (14 female). 31 internationally adopted from foster care controls (16 female) | 10-11 years | Experimental tasks: Go/No-go task, Flanker task | 2 |
| McDermott, J. M., et al. (2012). "Early adversity and neural correlates of executive function: Implications for academic adjustment." <i>Developmental Cognitive Neuroscience</i> 2: S59-S66. | Cross-sectional comparison | 33 randomised to care as usual (institutional) (13 female). 43 removed from institution and placed in foster care (21 female). | 41 NA control (17 female) | 8 years | Experimental tasks: Go/No-go task | 2 |
| McDermott, J. M., et al. (2013). "Psychosocial deprivation, executive functions, and the emergence of socio-emotional behavior problems." <i>Frontiers in Human Neuroscience</i> 7. | Cross-sectional comparison | 49 randomised to care as usual (institutional) (25 female). 54 removed from institution and placed in foster care (28 female). | 47 NA control (26 female) | 8 years | Experimental tasks: Flanker task | 2 |

| | | | | | | |
|---|---|---|---|----------------------|---|---|
| Merz, E. C. and R. B. McCall (2011). "Parent ratings of executive functioning in children adopted from psychosocially depriving institutions." <i>Journal of Child Psychology and Psychiatry</i> 52(5): 537-546. | Cross-sectional | 288 aged 6-18 years (167 female). 130 aged 2-5 years (71 female) | None | 2-18 years | Questionnaires: BRIEF and BRIEF-P | 3 |
| Merz, E. C., et al. (2013c). <i>"Inhibitory Control and Working Memory in Post-Institutionalized Children."</i> <i>Journal of Abnormal Child Psychology</i> 41(6): 879-890. | Cross-sectional comparison and longitudinal | 75 (46 female) | 133 NA controls (68 female). | 8-17 years | Standardised battery: CANTAB SWM, and SSP sub-tests | 2 |
| Merz, E. C., et al. (2013a). <i>"Parent-Reported Executive Functioning in Postinstitutionalized Children: A Follow-Up Study."</i> <i>Journal of Clinical Child and Adolescent Psychology</i> 42(5): 726-733. | Cross-sectional comparison and longitudinal | 471 (56% female), 150 selected for longitudinal analysis | 111 Globally deprived adopted children (49% female) | 6-18 years | Questionnaires: BRIEF | 3 |
| Pollak, S. D., et al. (2010). <i>"Neurodevelopmental Effects of Early Deprivation in Postinstitutionalized Children."</i> <i>Child Development</i> 81(1): 224-236. | Cross-sectional comparison | 48 (24 female) | 44 NA controls (20 female). 40 Early adopted controls (19 female) | 8-9 years | Standardised battery: CANTAB IED and SOC sub-tests | 1 |
| Sonuga-Barke, E. J. S. and Rubia, K. (2008). <i>"Inattentive/overactive children with histories of profound institutional deprivation compared with standard ADHD cases: a brief report."</i> <i>Child Care Health and Development</i> 34(5): 596-602. | Cross-sectional comparison | 13 who met the criteria for Inattention/Overactivity/Impulsiveness (I/OA) (7 female). 22 not I/OA (10 female) | 20 NA with ADHD (3 female) | Mean 13 years | Experimental tasks: From the MARS battery; Go/no go task, Tracking stop signal, Switch task | 3 |
| Tottenham, N., et al. (2010). <i>"Prolonged institutional rearing is associated with</i> | Cross-sectional comparison | 19 completed the neuropsychological | 27 completed neuropsychologic | Mean 8.2 years (1.9) | Experimental tasks: | 1 |

| | | | |
|--|------------------------|---------------------------|-----------------------|
| <i>atypically large amygdala volume and difficulties in emotion regulation."</i> <i>Developmental Science 13(1): 46-61.</i> | assessment (13 female) | al assessment (16 female) | Emotion go-no-go task |
|--|------------------------|---------------------------|-----------------------|

^a Beckett et al (2010) and Colvert et al (2008) used the same participants but reported different measures therefore both papers were included in this review. Of note the Beckett et al study includes Stroop outcomes however these were previously reported in Colvert et al (2008), and therefore were excluded to prevent duplication within this review.

^b It was not possible to extract information regarding number of males and females who took part in the study.

3. Results

3.1 Search Results

This systematic review includes 30 papers that were published by the 1st April 2015. The systematic search initially identified 895 records from three electronic database searches, a further 18 papers were included following a hand search of relevant texts and reviews. After the removal of duplicate texts, 831 records were screened and 788 texts were excluded for not meeting the inclusion criteria described in section 2.2. 43 full texts were reviewed which lead to the exclusion of 13 studies. Reasons for excluding these studies included; the assessment not containing a measure of executive functioning or the sample being children with a history of maltreatment but not specifically placed outside of the biological home (n=12). One study was excluded as it focused on maternal substance misuse and all children in the sample had been exposed to substances in utero.

3.2 Study characteristics

All 30 studies included were cross-sectional in design, 23 (76.7%) included at least one comparison group and seven (23.3%) completed a longitudinal analysis. The majority of the studies (n=25, 83.3%) took place in the USA, three studies (10%) were conducted in the UK, one occurred in Brazil and one in Colombia. Of the 30 studies identified, the majority (n=24, 80%) focused on children who were adopted internationally and had experienced psycho-socially depriving institutional care or lived in an orphanage. These studies will be abbreviated to post-institutionalised (PI) samples. Of the remaining 10 studies three (10%) explored children adopted within the country (henceforth labelled as 'Adopted') and three (10%) studied children in care (henceforth labelled as 'LAC'). Just under half of the studies (n=14, 46.7%) focused on middle childhood (approximately 7-11 years), 20% (n=6) on early childhood (≤ 6 years) and only one study focused on adolescence (≥ 12 years). The remaining 9 studies (30%) included children from across two or more of these categories. Only 11 studies (36.6%) reported effect sizes for their EF findings, where possible these will be described.

A broad range of methodology was used to assess EF in these studies. This included whole or sections of neuropsychological batteries (20% n=6), experimental tests (53.3%, n=16), and parent or teacher self-report measures (13.3%, n=4). 13.3% of the studies (n=4) used more than one of the aforementioned assessment techniques. Figure 2 outlines the measures used to assess EF for each study. Because of the broad range of methodology the studies shall be organised by assessment modality as well target population to enable comparisons across similar types of measures. Some studies used more than one of these assessment modalities and therefore will be described in more than one section.

3.3 Quality of included studies

The quality of included studies was assessed using the guidelines outlined in the Quality Assessment Tool for Quantitative Studies (EPHPP) by the primary researcher. Utilising this measure nearly half of the studies (46.6%, n=14) were classified ‘moderate’, 40% (n=12) as ‘strong’ and 13.3% (n=4) were rated as ‘weak’. The inter-rater reliability for the two raters was found to be Kappa = 0.68, 95% CI (0.44, 0.93).

3.4 Standardised neuropsychology batteries

3.4.1 PI studies

Eight studies used tests from standardised neuropsychological batteries to assess EF in PI children (see appendix 2 for a description of all standardised tests used).

The most frequently selected neuropsychological battery used to assess EF in PI children has been the Cambridge Neuropsychological Test Automated Battery (CANTAB; Cambridge Cognition), with 5 studies using a range of its’ sub-tests (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Merz et al., 2013c and Pollak et al., 2010). The CANTAB has been well validated for use with children (Luciana and Nelson, 2002). The following sub-tests have been used experimentally to measure aspects of executive functioning: Intra-Extra Dimensional Set Shift

(IED), Stockings of Cambridge (SOC), Spatial Working Memory (SWM) and Spatial Span (SSP).

The IED sub-test measures rule acquisition and manipulation. On the IED task Bauer et al (2009) and Hanson et al (2013) both found that PI children in their mid-childhood to early adolescence performed statistically significantly poorer ($p < .05$) than NA typically developing children. Pollak et al (2010) found that 8-9 years old PI children performed poorer on IED than controls and slightly worse than children adopted internationally prior to the age of 8 months, however neither of these effects reached statistical significance.

The SOC sub-test is a computerised variation of the Tower of London test, which predominantly assesses spatial planning. The performance of PI children on this task has been variable. Bauer et al (2009) and Hanson et al (2013) found PI samples to complete statistically significantly fewer trials correctly within the minimum number of moves compared to NA typically developing children ($p < .05$). However two other studies observed no difference in performance between PI and NA children (Bos et al., 2009; Pollak et al., 2010) and PI and children adopted internationally before the age of 8 months (Pollak et al., 2010). All four studies were examining PI children of similar age ranges, so variation in performance is unlikely to be accounted for by age. In addition the studies by Pollak et al, Bauer et al and Hanson et al all displayed similar durations of institutionalisation (mean time between 23-31 months) and children were adopted from a similar range of countries. Of note the Bos et al study only assessed Romanian PI children and the mean duration of institutionalisation was unclear. A number of potentially confounding variables were inconsistently controlled for which may have impacted on the outcomes, for example none of these studies appeared to assess whether IQ could be influencing performance and only Pollak et al reported mean IQ scores.

The SWM task looks at the ability to retain and manipulate spatial information. Four out of four studies of PI children between the ages of 8 and 14 years found PI samples to perform statistically significantly poorer compared to NA controls ($p < .01$) on the SWM task (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Pollak et al., 2010). PI children were observed to make statistically significantly more errors

than children internationally adopted before the age of 8 months ($p < .01$), these early adoptees performed similar to the NA sample (Pollak et al., 2013). Merz et al (2013c) compared PI children aged 8-17 years who were adopted ≤ 9 months with those adopted ≥ 14 months. In this comparison no significant differences were observed on the number of errors made on the SWM task ($d = 0.16$). Both Merz et al (2013c) and Bos et al (2009) identified that PI children with low birth weight made significantly more errors on the SWM task.

The SSP test is a visuospatial task that assesses working memory capacity. Only one study used the SSP test (Merz et al., 2013c). In this study PI children adopted ≥ 14 months were found to have a significantly smaller spatial span length ($p < .001$, $d = 0.65$) compared to both PI children adopted ≤ 9 months and NA children whilst controlling for age at assessment. PI children adopted ≤ 9 months were observed to have a similar spatial span length to the NA control sample.

Cardona et al (2012) used the NEUROPSI Attention and Memory Battery (Ostrosky-Solís, Esther Gómez-Pérez, Matute, Rosselli, Ardila & Pineda, 2007) to compare the cognitive performance of 18 PI males aged 7-15 years in Colombia with matched controls. The NEUROPSI has been validated and standardised for Spanish populations. On this battery the PI males performed worse than the control group on concept formation and inhibitory tasks ($p < .05$), no difference was observed on verbal and visual fluency tasks. However this study only included male participants and gender effects have been observed on some cognitive tasks therefore it is difficult to generalise the findings to the female PI population.

Eigsti et al (2011) measured cognitive control for 46 PI children and 24 NA controls aged 4-13 years using the auditory attention task from the NEPSY (Korkman, Kirk & Kemp, 1998). This sub-test requires the use of selective and sustained auditory attention. On this test PI children performed significantly poorer than the comparison group ($p < .05$, $\eta^2_p = 0.07$). In addition a weak correlation was observed between duration of institutionalisation and sustained attention ($p = .07$).

Beckett et al (2010) administered the reverse digit span test from the Third Edition of the Wechsler Intelligence Scale (WISC-III, Wechsler, 1991). On this sub-test PI

children aged 11 years who experienced >6 months of deprivation performed poorer than a pooled comparison group, however this difference did not reach statistical significance ($p=.06$, $\eta^2_p = 0.06$).

Overall on standardised neuropsychology sub-tests, the included studies suggest that PI children may perform poorer on tasks assessing rule acquisition and manipulation (IED), and the retention and manipulation of spatial information (SWM). There was limited evidence that spatial span (SSP), concept formation and inhibition (NEUROPSI), and selective and sustained auditory attention (Auditory attention task) may also be impacted. However due to the small number of studies which used those sub-tests it is difficult to draw generalizable conclusions at this stage. The evidence assessing spatial planning (SOC) was contradictory and it is unclear whether PI children may struggle with this aspect.

3.4.2 Studies of adopted children

This systematic search did not identify any studies assessing the executive functioning of adoptive children using standardised neuropsychological batteries.

3.4.3 LAC studies

Three studies used tests from standardised neuropsychological batteries to assess EF in the LAC population.

Two LAC studies were identified which used the NEPSY attention/executive function core domain as part of their EF assessment (Pears & Fisher, 2005; Pears et al., 2010). However these studies combined the NEPSY scores with other experimental and parent report measures to create composite scores, the NEPSY performance was not described separately. Pears and Fisher (2005) combined the NEPSY, Stroop Task and a Card Sort Task performance to create a composite EF score. Pears et al (2010) combined the NEPSY¹, modified Stroop task, Dimensional Change Card sort and the caregiver reports from the Inhibitory Control and Attention

¹ In the Pears et al (2010) study only the children aged 3 and 4 years at assessment completed the NEPSY domain (45 of the 85 participants).

Focusing scales of the Children's behaviour Questionnaire to create an inhibitory control composite score. Both studies compared young foster children aged 3-6 years with a matched non-maltreated group of children residing with their biological families. Pears and Fisher (2005) found a non-significant difference between groups on EF composite scores ($p=.07$). Additional post-hoc analyses discovered a trend that LAC children who had experienced more than the average number of placement moves prior to the assessment had lower scores on the EF composite. Pears et al (2010) found that LAC children scored significantly poorer on the inhibitory control composite ($p<.01$). Bivariate correlation highlighted that inhibitory control was significantly negatively associated with a history of maltreatment and foster placement and significantly positively associated with measures of school adjustment.

Bucker et al (2012) compared LAC children in Brazil with a history of early trauma with age-matched controls (age range 4-12 years). To assess executive functioning they used the Digit Span Test. They observed that the LAC group performed significantly poorer ($p<.05$) on Digits Span, Digits forward and Digits backwards, further exploration showed a significant interaction between psychiatric symptoms and performance on Digits span ($p=.01$, $r^2 = 0.16$) and Digits forward ($p=.01$, $r^2 = 0.16$) in this population.

Due to the few studies using standardised assessment sub-tests it is difficult to draw reliable conclusions regarding the performance of LAC samples. There is some initial evidence that young LAC samples may have difficulties with EF and inhibitory control, and that middle childhood may be associated with digit span difficulties.

3.4.4 Summary of standardised neuropsychology batteries

Overall the included studies using standardised neuropsychology sub-tests demonstrated EF difficulties for PI children, the evidence was strongest for tasks assessing rule acquisition and manipulation, and the retention and manipulation of spatial information. The few identified LAC studies suggested potential difficulties

with EF, inhibitory control and digit span. No studies of adopted children were identified that used standardised neuropsychological measures.

3.5 Experimental measures

3.5.1 PI studies

Fourteen of the identified PI studies included at least one experimental task to measure EF.

Four studies reported performance for a version of the Go/no-go task, this task generally involves participants inhibiting a pre-potent response and selectively responding to a target stimuli. McDermott et al (2012) and Loman et al (2013) both found that PI and control populations (aged 8 and 10-11years respectively) were more accurate for 'go' than 'no-go' trials ($p < .001$). However, within the 'go' condition PI children who remained in institutional care performed less accurately ($p < .05$) than PI children who moved to foster care (McDermott et al., 2012), internationally adopted children from foster care (Loman et al., 2013) and never institutionalised control groups (Eigsti et al.,² 2011; Loman et al., 2013; McDermott et al., 2012). This pattern of results was hypothesised to indicate underlying difficulties in sustained attention as opposed to selective attention or response inhibition (Loman et al., 2013; McDermott et al., 2012). McDermott et al (2012) also found that a PI group who stayed in institutional care displayed slower response times ($p < .05$) than a PI group who moved to foster care and NA control groups for 'no-go' trials. However, Eigsti et al and Loman et al tested reaction speed but found no significant differences between PI and both internationally adopted children from foster care and NA controls. Loman et al noticed an interaction of gender within the reaction time, with PI males performing significantly slower ($p < .05$) than NA males, however this effect was not observed for PI females. A relationship between performance and duration of institutionalisation ($p < .05$) was observed by both Eigsti et al (2011) and Loman et al (2013) with children staying in institutions longer, responding slower. Tottenham et al (2010) employed an emotion go/no-go task to measure self-regulation in emotional contexts. They observed that all children (PI

² $\eta^2_p = 0.08$

and never institutionalised controls, mean age 8.2 years) were more accurate and faster in performance for positive stimuli (positive facial expressions). However PI children who spent the longest time in care made significantly more false alarm errors ($p < .05$) on the negatively valenced faces.

Three studies assessing children between the age of 5 and 17 years have employed the Gordon Diagnostic System (GDS, Gordon, 1982) to gain a measure of EF (Behen et al., 2008; Chugani et al., 2001; Eluvathingal et al., 2006). The GDS is a computerised assessment of attention and self-control. Behen et al (2008) found that for PI children rated as globally intact ($IQ < 85$) 24% ($n=13$) were rated as impaired on one or more of the EF domains. Chugani et al (2001) and Eluvathingal et al (2006) both looked at the neurocognitive profile of small groups of PI children compared to normative data ($n=10$ and 7 respectively). Using the GDS Chugani et al identified severe impairments in impulsivity and mild impairments in sustained attention, Eluvathingal et al found mild impairments in impulsivity and low average performance in sustained attention.

Two studies reported performance on the Flanker task (Loman et al., 2013; McDermott et al., 2013). The Flanker task assesses response inhibition in the context of distracting stimuli. Both studies found that PI and control groups were more accurate and faster on congruent trials than incongruent trials ($p < .05$). Loman et al identified that the PI participants (aged 10-11 years) were less accurate than control groups ($p < .001$), however McDermott et al only found this effect for incongruent trials ($p < .001$), where a PI group (aged 8 years) who remained in institutions and a PI group who moved to foster care were both less accurate than NA control. In addition Loman et al did not observe any differences in reaction time, whereas McDermott et al found that the both PI groups were slower than NA controls on congruent trials ($p < .05$).

Sonuga-Barke et al (2008) used three computerised tasks from the Maudsley Attention and Response Suppression battery³ (MARS, Rubia et al., 2001, 2007) to compare PI children with a history of Inattention/Overactivity/Impulsiveness (I/OA),

³ This study was included under the experimental measures section as no normative data could be found on the MARS battery at time of the writing of this review.

PI children without I/OA and ADHD NA controls (mean age 13 years). The tasks used were the Stroop Signal task, Go/No-Go task and Switching task. Although no statistically significant differences were observed, the PI I/OA group displayed greater impairments on these tasks than either the ADHD or PI control groups, whose performance was similar. Colvert et al (2008) used the Stroop task (Stroop, 1935) to assess the ability to inhibit pre-potent responses at age 11 years. This study compared Stroop performance of; PI children, internationally adopted without a history of institutionalisation and children adopted within the UK before the age of 6 months. Significant differences ($p < .001$, $\eta^2 = 0.12$) were found between the groups, with the PI group displaying more Stroop errors than either control group. EF performance correlated with duration of deprivation ($p < 0.01$), as measured by age of entry to the UK, as well as weight and head circumference at entry ($p < .05$ and $p < .01$). PI children who spent the longest time in institutions displayed the poorest EF performance and this effect remained when IQ was controlled.

Chugani et al (2001) employed the Trails A&B tasks as a measure of EF. These tasks involve maintaining visual attention, following a sequence and set-switching. Chugani et al reported that the mean performance of the 10 PI participants fell within the mild impairments range.

Beckett et al (2010) used the FAS task (Benton and Hamsher, 1977) which assesses verbal fluency and the Tower of London paradigm (Shallice, 1982) which tests planning efficiency. On the FAS, PI children aged 11 years who experienced >6 months of deprivation and displayed ‘deprivation specific psychological patterns’ did not display significant differences on total correct words ($\eta^2_p = 0.03$) but reported significantly more incorrect words ($p < .05$, $\eta^2_p = 0.05$). This was in comparison with a pooled control group (see figure 2). Statistically significant difficulties were also identified on the Tower of London total correct solutions score ($p < .01$, $\eta^2_p = 0.07$).

Three studies combined a range of experimental tasks to create an EF or inhibitory control composite score (Bruce et al., 2009; Doom et al., 2014; Hostinar et al., 2012) (see figure 2 for a breakdown of individual tasks included). Hostinar et al and Doom et al both compared toddler’s aged ≤ 4 years whereas Bruce tested children aged 6-7

years. On composite scores PI children performed statistically significantly poorer ($p < .01$) than foster children (Bruce et al., 2009) and NA children ($\eta^2 = 0.09$, Bruce et al., 2009; $\eta^2_p = 0.24$, Hostinar et al., 2012). Bruce et al (2009) found no differences on performance between the foster care and NA control groups. In addition inhibitory control scores were identified to mediate the relationship between disinhibited social behaviour and length of time in institutional care. Doom et al (2014) found that duration of institutional care and iron deficiency at adoption predicted variation in EF performance, however this effect did not remain significant once the IQ was included as a covariate. In line with this Hostinar et al (2012) did not observe an effect of duration of institutionalisation on EF ability after controlling for IQ ($r_p = 0.05$). However positive correlations ($p < .05$) were found between ratings of quality of institutional environment and EF scores ($r_p = 0.37$), and time spent with birth family before adoption and EF scores ($r = 0.29$).

A wide range of experimental tasks were used to assess EF in the PI population. On tasks requiring children to inhibit pre-potent responses (e.g. Go/No-go, Stroop task) PI children appeared to perform less accurately and slower than NA controls. Results relating to the Flanker task were varying, although some difficulties in task performance were observed it is unclear under which conditions this might occur. On the GDS, a measure of sustained attention and self-control, the PI samples were displaying some mild to severe impairments, however the studies described had small sample sizes and did not include comparison groups, making it difficult to draw reliable conclusions. In addition one study identified some specific verbal fluency and planning difficulties. Composites of experimental tests suggested that PI toddler's aged ≤ 4 years might display some EF difficulties. From the experimental studies it is unclear whether duration of institutionalisation may moderate EF ability due to the variability in results.

3.5.2 Studies of adopted children

Three studies assessing adopted children utilised experimental measures (Leve et al., 2013; Lewis et al., 2007; Mueller et al., 2012).

Leve et al (2013) assessed effortful attention (using the shape Stroop task) and delay of gratification (using the gift delay task) for adopted toddlers (≤ 27 months). In this study latent growth modelling identified that toddler effortful attention was positively associated ($p < .001$) with toddler language development, birth mother verbal IQ and gender (female). Delay of gratification was positively associated ($p < .01$) with language development and gender (female). Lewis et al (2007) identified that adopted children aged 5-6 years who had experienced more than one placement and had a history of pre-adoption placement instability performed poorer ($p < .01$, $\eta^2 = 0.20$) on a laboratory measure of inhibitory control (the day to night task, Gerstadt et al., 1994) than adopted children without a history of placement instability or NA controls. This effect remained following controlling for age at assessment and working memory performance. Mueller et al (2012) examined the impact of monetary incentives on prosaccade and antisaccade tasks for adopted children and NA controls (mean age 11 years). The results found that adopted children responded slower on all trial types ($p < .05$), in addition unlike the control group they failed to show an improvement in performance on antisaccade trials that were incentivised ($p < .05$). As this effect was not observed for incentivised prosaccade trials they concluded that this diminished reward sensitivity related to underlying inhibitory control deficiencies as opposed to a reduced attention capacity.

Overall few studies have assessed EF in adopted children using experimental tasks, of those that have, differences in test selection prevents reliable comparisons.

3.5.3 LAC studies

Only one study was identified to use experimental tasks to assess EF in LAC.

Bucker et al (2012) compared LAC children in Brazil with a history of early trauma with age-matched controls, their assessment included the Wisconsin Card Sort Test (WCST) and the Continuous Performance Test (CPT). In this study the LAC group displayed significantly more ($p < .05$) CPT commission errors than the control group. Differences were not observed for other parts of the assessment. As this was the only study included which used experimental measures to assess EF, it is not possible to draw generalizable conclusions.

3.5.4 Summary of experimental measures

Experimental tasks were the most frequently used means of assessing EF across all three populations ($n = 18$), however the tasks used varied greatly. PI children demonstrated some difficulties on tasks requiring the inhibition of pre-potent responses, sustained attention and self-control, additionally one study identified verbal fluency and planning difficulties. Adopted studies showed differences in incentivised task performance, furthermore a history of pre-adoption placement instability was associated with poorer inhibitory control performance. One LAC study showed more errors on a selective and sustained attention task.

3.6 Parental report measures

3.6.1 PI studies

Four studies used parental report measures to assess EF in PI children; all of these studies used the BRIEF questionnaire.

The BRIEF (Gioia, Isquith, Guy & Kenworthy, 2000) and BRIEF-P (Gioia, Espy & Isquith, 2005) questionnaires have been used to assess EF in PI children from age 2 to 18 years (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall, 2011; Merz et al., 2013a). These questionnaires have demonstrated adequate reliability and validity (Strauss, Sherman & Spreen, 2006; Sherman & Brooks, 2010).

Groza et al (2008) compared children adopted from Romania with and without a history of institutionalised care. Adoptive parents were found to score all children more highly (more problems) than teachers for both the Behavioral regulation (BRI) and Metacognition (MCI) indices ($p < .005$). An effect of pre-adoptive placement was observed, on the BRI parents rated children who lived in family settings at 0-1 months as significantly lower (better) than those in non-family settings at the age of 3 years ($p < .05$). Additionally teacher rated BRI and MCI scores for children who lived in family settings at 0-1 months were significantly lower than those moving to family settings at age 1-6 or 6-12 months, all of these groups scored lower than children in non-family settings at the age of 3 years ($p < .001$). A similar pattern was

found by Merz and McCall (2011), they identified a ‘step-like’ association between age of adoption and EF scores with children adopted after 18 months showing more difficulties than those adopted before 18 months and the never institutionalised normative data ($p < .05$). Furthermore hierarchical multiple regressions identified an interaction between age of adoption, age of assessment and BRIEF scores, it indicated that the onset of adolescence (defined as age 12) corresponded to higher EF problems in children adopted ≥ 18 months. Merz et al (2013a) followed up on the Merz and McCall (2011) study to examine continuity in EF following 2 years and to compare the PI group with a group of children who had experienced early global deprivation. The mean Global Executive Composite (GEC) remained fairly constant over time and the observation of higher EF problems in children adopted ≥ 18 months was replicated ($d = 0.56 - d = 0.61$). In addition globally deprived children were found to have significantly higher levels of EF problems ($p < .001$, $d = 0.44$) than the PI sample. The globally deprived children adopted < 9 months or ≥ 18 months had higher levels of EF problems than the BRIEF standardisation sample ($p < .05$), however this effect was not observed for children adopted aged 9-17 months.

On the BRIEF-P Merz and McCall (2011) observed no significant differences between pre-school aged PI children and normative data and no correlations between age of adoption and BRIEF-P scores. However Jacobs et al (2010) found that age of arrival strongly predicted all BRIEF-P areas of performance ($p < .05$) for PI children⁴ aged 5 years, with younger age being associated with better performance. Although Jacobs et al did not compare this sample to normative data they did report that 11% of children scored in the ‘problem range’ for the BRIEF-P GEC. Jacobs et al also identified borderline negative correlations ($r = -.35$ to $r = -.41$) between arrival visual reception score and three BRIEF sub-scales (inhibition, working memory, planning/organizing ability). In addition children who qualified to receive an early intervention service displayed poorer BRIEF-P scores ($p < .05$).

In summary parent and teacher reports have consistently identified above average EF and attention difficulties for PI children aged 5-18 years on the BRIEF. Furthermore it appears that longer duration of institutionalisation may be associated with poorer

⁴ Although the study did not explicitly recruit PI children 94% of the sample were adopted internationally from orphanages.

reported EF ability on the BRIEF. However it is unclear whether children aged 2-5 years display EF difficulties and whether these are related to length of institutionalisation.

3.6.2 Studies of adopted children

This systematic search did not identify any studies that used only parental report to assess EF in adopted children.

3.6.3 LAC studies

No studies using only parental report to assess EF in the LAC population were identified in this search.

3.6.4 Summary of parental report measures

Studies utilising parental report measures were only identified for the PI population. These studies showed reported EF difficulties for children older than 5 years of age and performance was linked to duration of institutionalisation.

4. Discussion

4.1 Summary of results

The primary aim of this systematic review was to extract and synthesise relevant data relating to whether LAC, adopted and PI children show deficits on tests of EF. The majority of studies across all three populations used experimental measures to assess EF ($n = 18$). Most studies examined EF with PI children ($n = 24$) and although a wide range of tasks were used, a number were repeated allowing some specific comparisons to occur, especially on several of the CANTAB sub-tests (IED, SWM and SOC). A common theme identified across the PI studies was examining the effect of duration of deprivation on functioning ($n = 15$). Of interest a total of only 6 studies were identified which examined EF in the LAC and adopted populations. Considering that more LAC and adopted children reside in the UK than PI children, this review highlights the imbalance in allocation of research resources, and the difficulties in accurately generalising the current findings to the wider population of LAC and adopted children. Furthermore as these limited number of studies used a broad range of tools to assess EF, it was difficult to draw reliable conclusions for these populations.

The second aim of this systematic review was to compare across these three populations to identify similarities or differences in EF abilities. It was not possible to complete this aim due to the paucity of research looking at EF abilities in the adopted and LAC populations.

4.1.1 LAC studies

From the three studies that were identified assessing LAC samples there appeared some initial evidence that young LAC populations (3-6 years) might have difficulties with EF and inhibitory control. However at age 6-7 years Bruce et al (2009) found no differences on an EF composite between the LAC and NA control groups.

4.1.2 Studies of adopted children

Within the adoption research one study suggested the existence of inhibitory control difficulties, another identified a reduction in reaction time on eye saccade trials and a third identified potential variables that may influence delay of gratification and effortful attention development. Children adopted <6 months of age were included in comparison groups (Beckett et al., 2010; Colvert et al., 2008) and displayed significantly better performance on EF tasks compared to PI children. However as NA controls were not included and all children were adopted <6 months, it is difficult to draw conclusions about EF functioning for this comparison sample.

4.1.3 PI studies

A much larger research base was identified for the PI children. Studies employing parental report measures (n = 4) consistently identified above average EF difficulties in PI children aged >5 years, although it is unclear whether a similar pattern is seen for children <5 years. Furthermore in parental reported EF ability appeared to be associated with duration of institutionalisation, with later adoption being linked to poorer EF.

Laboratory based assessment measures were more variable in their findings and many measures were only used in one study making comparisons and synthesis difficult. Several studies provided evidence for PI children performing poorer on tasks assessing: working memory, rule acquisition and reversal, retention and manipulation of visuospatial information, and the inhibition of pre-potent responses. Additionally, composites of experimental tests suggested that PI toddlers might display some EF difficulties. However, studies looking at response inhibition and planning abilities were inconstant in findings, with some suggesting difficulties and others reporting no significant differences between PI and NA controls. With regards to the association between duration of institutionalisation and EF, this again was inconclusive with the same number of analyses suggesting an association as those failing to replicate the finding.

Overall, taking into account the results from both the parental report and laboratory measures for the PI studies it appears that PI children do exhibit some difficulties with EF, however the specific EF difficulties are unclear.

4.2 Limitations of included studies

Due to small number studies identified through the systematic search it was decided to include studies rated as poorer in quality (n=4, see figure 2). Common components that were rated as ‘weak’ in these studies included low participation rates and lack of description of controlling for potential confounders. These studies may be more liable to a range of biases and therefore it is important to keep this in mind when interpreting these findings. In addition two of the studies included explored EF in samples of ten or less (Chugani et al., 2001; Eluvathingal et al., 2006), and may be less likely to accurately represent the target population.

A key issue for studies attempting to examine EF is the validity of the tools and measures used. There are a wide range of EF assessment measures available however the sensitivity and ecological validity of these have been questioned. It is well reported that individuals with frontal lobe damage can show intact performance on EF tasks but display debilitating effects on daily life (e.g. Eslinger & Damasio, 1985; Levine, Robertson, Clare, Carter, Hong, Wilson et al., 2000). It has been postulated that EF measures need to be complex, novel and involve multiple processes (Anderson, 2002), however it is difficult to separate executive and ‘non-executive’ functions in more complex, ecological valid tasks. Additional problems related to applying standardised assessment tools specifically with PI populations have been highlighted (MacLean, 2003). For example Mainemer, Gilman & Ames (1998) found that PI children were scored more highly on Distractibility/Hyperactivity subscale of the Parenting Stress Index (Abidin, 1990) than NA controls, despite contradictorily being described as passive and quiet. On further review it appeared that PI children were rated highly on the distractibility items but not the hyperactivity items of the scale. Therefore taking quantitative results at face value could indicate a different clinical picture of problems. Bearing these difficulties in mind it may be over simplistic for studies to solely rely on tasks hypothesised to quantify EF and a more accurate picture of EF might be gathered

through combining multiple sources of information (e.g. including parental report and observations, Anderson, 2002). Although most studies included in this review (n=20) used more than one single EF task or questionnaire, only one study gathered data using a combination of EF tasks and parental report (Pears & Fisher, 2005). As a result it is possible that some of the studies may have demonstrated either false negatives or false positives in detecting EF difficulties, particularly given the varied and heterogeneous nature of EF.

4.3 Limitations of the current review

Only one reviewer was involved in the initial search and selection of studies to be included in this review. It is possible that using one reviewer may have influenced the selection of papers to be included in the review. To maximise the systematic protocol and reduce potential selection bias a strict exclusion and inclusion criteria was adhered to (as described in section 2.2). Furthermore, to ensure the inclusion of as many relevant studies as possible all references within the identified papers and related published reviews were considered.

A difficulty of reviewing EF as a concept is that it is a wide ranging construct that consists of a broad range of processes which overlap with a number of other cognitive processes (e.g. attention and emotion regulation). This is problematic as searching for all potential processes under the EF umbrella is likely to amass a vast number of heterogeneous studies. In an attempt to focus this review only studies that explicitly reported assessing EF or an EF process in the article were included. Furthermore only the EF measures were extracted from the studies. This means that studies assessing aspects of EF that were not described as an EF may have been missed. For example Merz et al (2013b) identified attention difficulties in PI children on the Connors Parent rating Scale (CPRS, Connors, 2000), however this study was not incorporated as it did not aim to assess EF and therefore it failed to fit the inclusion criteria.

An additional factor that may have impacted on the reliability of this review was the decision to only include studies published in peer-reviewed journals. This means

that relevant ‘grey’ literature might have been missed. Excluding ‘grey’ literature can lead to overestimation of the effectiveness of interventions (Hopewell, McDonald, Clarke & Egger, 2007; McAuley, Tugwell & Moher, 2000) and may lead to a reporting bias. The publication bias for studies describing a significant effect to be more likely to be published has been well reported (Turner, Boutron, Hróbjartsson, Altman & Moher, 2013). To help determine whether a publication bias occurred a funnel plot was created for all the key EF measures described for 14 of the 23 studies that contained a comparison group⁵. The funnel plot displayed a slight skew to the left suggesting studies reporting larger effect sizes might be missing (see appendix 3).

4.4 Findings in context of EF literature

The identification of likely EF difficulties in children who have experienced early life disruption is in line with previous reviews of both behavioural and neuroimaging studies. These studies have identified that a child’s early environment can impact on broader cognitive development as well as specifically EF development (Hughes, 2011; Irigaray, Pacheco, Grassi-Oliveira, Fonseca, Leite & Kristensen, 2013; Petchel & Pizzagalli, 2011) and associated neurobiological structures (Hart, 2012; Nelson et al., 2011). Furthermore this is in agreement with ideas relating to the impact of developmental stress on the stress response systems. Gunnar and Quevedo (2007) provided an overview of the impact of early stress on neurobiology. They concluded that sensitive periods of brain plasticity and development appear to be more vulnerable to the negative effects of early chronic stress and that disruptions in caregiver relationships and provision of care can contribute to changes in physiological and behavioural responses (see Gunnar & Quevedo, 2007 for a review). As EF deficits have also been observed in common neurodevelopmental conditions such as Autistic Spectrum Disorder (Corbett, Constantine, Hendren, Rocke & Ozonoff, 2009; Hughes, Russell & Robbins, 1994; Ozonoff, Pennington & Rogers, 1991) and Attention Deficit Hyperactivity Disorder (Happé, et al., 2006; Willcutt et al., 2005), it is possible that children who have experienced early life disruption may display some similarities in clinical presentation. The findings of this

⁵ For 9 studies it was not possible to calculate either the effect size or standard error and therefore they were not included in the funnel plot.

review also fit with key developmental theories such as attachment theory (Bowlby, 1958), social learning theory (Bandura, 1977) and social-cultural theory (Vygotsky, 1978) which postulate the importance of the early relationships and social and emotional experiences in influencing development.

A key variable of interest in many of the included studies was the impact of length of institutionalisation on EF. Parental report measures all observed that earlier adoption was associated with improved functioning (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall 2011; Merz et al., 2013a; Merz et al., 2013b) and several laboratory assessments were in accordance with this finding (Colvert et al., 2011; Eigsti et al., 2011; Loman et al., 2013; Merz et al., 2013c; Tottenham et al., 2010). However some papers failed to identify this effect (Doom et al., 2014; Hostinar et al., 2012; Merz et al., 2013c). Many studies have identified that children adopted prior to 6 months are less likely to show developmental, cognitive or social problems (Gunnar, 2001; MacLean, 2003; Rutter, Beckett, Castle, Colvert, Kreppner, Mehta et al., 2007), however the relationship between length of institutionalisation and outcomes is unclear (Crockenberg, Rutter, Bakermans-Kranenburg, van IJzendoorn, Juffer, Collins et al., 2008). A review by Julian et al (2013) concluded that the majority of studies examining PI children detected a step-like effect of age of adoption on functioning and that this effect is more apparent in adolescences and for those who had experienced global deprivation. Two of the studies that failed to replicate the age of adoption effect (Doom et al., 2014; Hostinar et al., 2012) both evaluated toddlers aged 4 years or younger, therefore the lack of observed relationship in these studies might be related to participant age.

The literature on the ability for children to recover EF abilities and factors that support this is less well developed due to the lack of longitudinal research. The ERA studies have shown that PI children adopted from Romanian orphanages can demonstrate dramatic cognitive and developmental ‘catch up’ (Rutter et al., 2007; Rutter, Sonuga-Barke, Beckett, Castle, Kreppner, Kumsta et al., 2010). However, studies assessing children who have experienced a brain insult have equally suggested that younger children may ‘grow into’ their cognitive impairments and therefore discrepancies with expected performance may become more apparent with age (Anderson & Ylvisaker, 2009). With regards to EF specifically, varying degrees

of EF recovery has been observed in paediatric populations. For example good EF catch up was observed in children 7-12 years after experiencing bacterial meningitis (Anderson et al., 2004), and domain specific differential rates and levels of recovery were observed 2 years following paediatric traumatic brain injury (Anderson & Catroppa, 2005). Within the PI population Bos et al (2009) identified significant differences on one of the two measures of EF (CANTAB SWM) between children randomly allocated to remain in institutions or to move to foster care, with the foster care group performing better. However a pre-allocation EF assessment did not occur making it difficult to determine whether this result demonstrates recovery or pre-existing between group differences.

4.5 Conclusions

This review provides further evidence for the impact of environmental and social factors on EF development. Children adopted from depriving institutions may be more likely to exhibit EF difficulties, particularly if they are removed from institutions at older ages. Furthermore although there is a paucity of research currently examining EF in adopted and looked after children, the current evidence taken alongside the known impact of childhood maltreatment suggests that these populations may be at higher risk for exhibiting EF difficulties.

There are still large gaps within the literature, particularly for the adopted and LAC populations. Given that within the UK there are more LAC and adopted than PI children, this discrepancy in research needs to be addressed before conclusions can be drawn. In particular large LAC and adopted studies utilising a consistent range of well validated EF tools are necessary to understand whether these populations struggle with EF abilities compared to children who reside with their birth families. In addition due to the broad range of EF abilities it is necessary to clarify which specific EF domains are affected to enable targeted interventions. Furthermore there is a need for more longitudinal studies to understand whether EF abilities show recovery and if so the factors important to maximise this.

Clinically this systematic review highlights that children who have experienced early life disruption or maltreatment may experience more cognitive and EF difficulties.

Considering the importance of the EF in completing goal directed tasks, clinicians may find it helpful to gather information on EF when thinking about how best to support children and families. Moreover due to the difficulties in assessing EF, incorporating more than one assessment modality (e.g. parental report and standardised tests) may provide a more accurate picture of any difficulties.

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6. Appendices

6.1 Appendix 1: This presents the search terms used to identify relevant studies.

- 1) “looked after” or LAC or welfare or foster or adopt* or institutional* or abuse or neglect or maltreatment or trauma or violence
- 2) child* or CYP
- 3) executive funct*

6.2 Appendix 2: Description of standardised neuropsychological sub-tests used in studies included in this review.

The following information is extracted from either the test manual or cited paper.

CANTAB Intra-Extra Dimensional Set Shift (IED) (Cambridge Cognition) –

This is a computerised analogue of the Wisconsin Card Sorting test that assesses rule acquisition and reversal. Participants must figure out a pattern to enable them to predict the next correct answer in the series. This underlying pattern changes a number of times and the participant must adjust their predictions in accordance with this.

CANTAB Stockings of Cambridge (SOC) (Cambridge Cognition) – This is a planning task akin to the Tower of London task. Participants observe two displays of coloured ‘balls’ hanging within ‘stockings’ or ‘socks’. The participant must move the balls in the lower half of the screen to make the pattern match that of the top half of the screen,

CANTAB Spatial Working Memory (SWM) (Cambridge Cognition) – This task requires the retention and manipulation of visuospatial information. Participants are presented with an increasing number of coloured boxes, within these they must find a blue token whilst holding in mind the rule that the token will never return to the same box twice in each trial.

CANTAB Spatial Span (SSP) (Cambridge Cognition) – This is a visuospatial analogue of the Digit Span test that assesses working memory capacity. The participant is presented with a screen of white boxes, some of which briefly change colour. Participant must replicate the pattern observed by touching the boxes in the same order.

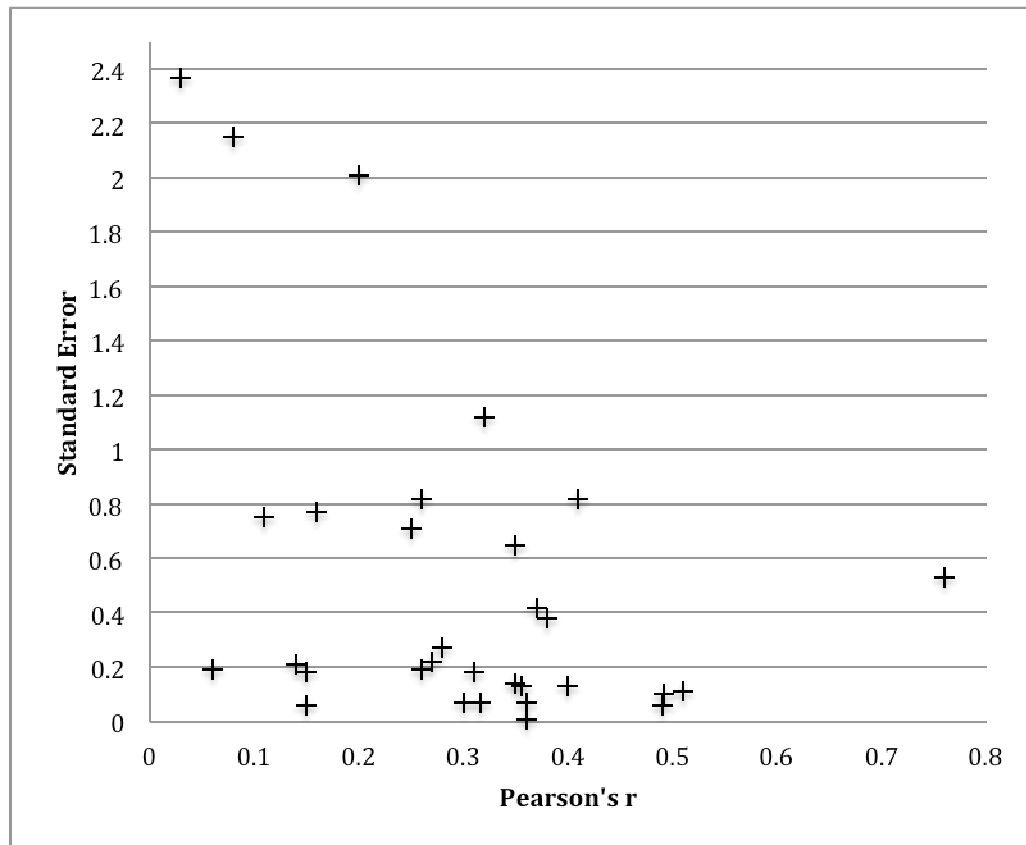
NEPSY auditory attention task (Korkman et al., 1998)– This test is designed to assess selective attention and the ability to sustain it. The participant listens to a list of words and must touch the appropriate circle in the stimulus book when he or she hears a target word.

NEUROPSI Attention and Memory Battery (Ostrosky-Solís et al., 2007) – This is a standardised battery validated for use with Spanish speakers. It assesses the following domains: orientation, attention and concentration, executive functions, working memory, immediate visual memory, and delayed visual memory. The executive functioning domain assesses the following processes: concept formation, flexibility, inhibition, and motor programming.

WISC-III reverse digit span test (WISC-III, Wechsler, 1991) – This is a measure of working memory. Participants must register an auditory stimulus (numbers) and manipulate them (reverse them) prior to their recall. The trials gradually increase in number of items presented.

6.3 Appendix 3: Displays a funnel plot showing the effect sizes for difference in EF functioning tasks between the target and control populations.

A slight skew to the left of the scale for be detected suggesting missing studies reporting larger effect sizes.



Main research project

DO CHILDREN ADOPTED FROM
BRITISH FOSTER CARE SHOW
DIFFICULTIES IN EXECUTIVE
FUNCTIONING AND SOCIAL
COMMUNICATION?

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Abstract

Background

Over the last five years the UK government has strived to reduce the age of adoption and to increase adoption rates. Although adoption is generally associated with positive outcomes, a number of placements disrupt or continue in the context of on-going difficulties. Early life experiences have an important impact on a child's emotional, social and cognitive development. Studies of children adopted from psychosocially depriving institutions have found difficulties in executive functioning and social communication ability, however it is unclear whether a similar pattern is observed in children adopted from foster care.

Objectives

This study aims to clarify whether UK adoptees show executive functioning or social communication deficits. It will explore whether these abilities are related to pre-adoption variables, particularly focusing on the effects of age of adoption and reported history of maltreatment. Finally this study will examine whether these abilities show 'recovery' following adoption and if so whether this is affected by age of adoption.

Methods

30 UK adoptees aged 7-11 years completed an assessment of their intellectual and executive functioning abilities using the WASI-II and sub-tests from the CANTAB. Adoptive parents completed questionnaires assessing their child's mental health, executive functioning and social communication traits (using the DAWBA, BRIEF and SCQ).

Findings

A statistically significant reduction in executive functioning performance compared to normative data was observed on two of three CANTAB tasks and parental report. This was in the context of preserved overall cognitive ability. A strong negative correlation was observed between age of adoption and BRIEF scores when ADHD was controlled for. No other pre or post adoption variables strongly correlated with executive functioning performance. All children scored below the recommended

SCQ cut-off, and a moderate positive correlation was observed with age of adoption. Elevated reports of emotional and behavioural difficulties were found.

Conclusions

The identification of raised mental health concerns and executive functioning difficulties is in line with the current limited research base. However, the correlation between BRIEF scores and age of adoption was contrary to a number of post-institutionalised studies. Limitations and implications for future research are discussed.

1. Introduction

1.1 Adoption in the UK

In England there were 68,840 children placed in care at the end of March 2014, most of whom (62%) became known to social services due to experiences of abuse or neglect (Office for National Statistics (ONS), 2014). The number of children residing in care in England has shown a steady increase over the past 5 years. Although the aim of reunification with the birth family tends to be the preferred outcome (Boddy, 2013), studies have identified that up to two-thirds of maltreated children who return home may be removed into care once more (Biehal, Wade, Farrelly & Sinclair, 2011; Farmer & Lutman, 2012). There is broad agreement that children have a number of changeable needs (such as stability and warmth), which are key to help a child flourish. It has been proposed that for many children their needs would be best met through adoption (Department of Education (DfE), 2012). Pre-adoptive factors such as the age of adoption and previous experiences in foster care have been linked to more post-adoption difficulties (Selwyn, Sturgess, Quinton & Baxter, 2006; Simmel, Brooks, Barth & Hinshaw, 2001). In line with this, over the last few years there has been a government supported drive to increase adoption rates and reduced the average age of adoption (as outlined in the DfE *An Action Plan for Adoption: Tackling Delay*, 2012). This drive has been demonstrated in national statistics showing that between the 31st March 2013 and 31st March 2014, 5050 children were adopted; a rate that was 26% higher than the preceding year and 58% higher than seen in 2010. Furthermore the average age of adoption has fallen from 3 years 11 months in 2010 to 3 years 5 months in 2014 (ONS, 2014).

Although adoption is generally associated with positive outcomes for both adopted children and adoptive parents (Fisher, 2003; Rushton, 2007; Rutter, Bishop, Pine, Scott, Stevenson, Taylor et al., 2011), sadly in the UK between 2 and 24% of adoptions are likely to breakdown (Beckett, Pinchen & McKeigue, 2014; Biehal, Ellison, Baker & Sinclair, 2010; Fratter, Rowe, Sapsford, & Thoburn, 1991; Rushton & Dance, 2006; Selwyn et al., 2006; Thoburn, Norford, & Rashid, 2000; Triseliotis, 2002). The large variation in reported adoption disruption rates reflects the different samples monitored (e.g. age and different level of needs) as well as inconsistencies in

the definition of a breakdown (e.g. separating or combining pre and post adoption breakdown figures). Of the families where a disruption does not occur, a quarter to a third may report on-going placement difficulties (e.g. Rushton & Dance, 2006; Selwyn, Wijedasa & Meakings, 2014).

Several studies and reviews have attempted to identify factors that influence the likelihood of a placement breakdown occurring (Biehal et al., 2010; Coakly & Berrick, 2008; Evan B. Donaldson Institute, 2004; Rushton, 2004). Factors explored have included those relating to the child, family and the post-adoption systems. Age of adoption appears to be one of the strongest predictors of placement breakdown (Biehal et al., 2010; Coakly & Berrick, 2008; Selwyn et al., 2014). A recent research report published by Selwyn et al (2014) identified three predictors of adoption breakdown: child's age, age at placement and time between adoptive placement and order. Of these, the child's age was identified as the biggest predictor of adoption breakdown with adolescents (aged 11-16 years) being identified as ten times more likely to have a disruption compared to children below the age of four years. In addition, risk of adoption disruption increased with age adopted, with children adopted before 12 months being the least likely to experience an adoption breakdown and those adopted after 4 years being at highest risk. Finally they found that children who waited more than two years for an adoption order to be granted were 1.5 times more likely to have placement breakdowns compared with those whose order was finalised within a year of placement. Post-adoption services appear to be vital in minimising disruptions and maximising stability (Evan B. Donaldson Institute, 2004).

1.2 Do adopted children experience difficulties?

1.2.1 Emotional and behavioural difficulties

Studies have shown that looked after, internationally adopted, and domestically adopted children have an increased likelihood of developing behavioural disorders (Biehal et al, 2010; Ford, Vostanis, Meltzer, & Goodman, 2007; Garland, Hough, McCabe, Yeh, Wood & Aarons, 2001; Hodges, 2008; Howe, 1997; Lawrence, Carlson & Egeland, 2006; Selwyn et al., 2014). Biehal et al (2010) identified that

38% of a sample of UK adoptees displayed clinically significant difficulties as measured by the Strengths and Difficulties Questionnaire (SDQ, Goodman, 1997). The most frequently reported difficulties being related to behaviour, hyperactivity and peer relationships. Age of adoptive placement was found to relate to the severity of difficulties, with children placed prior to 3 years displaying less serious difficulties. In addition Selwyn et al (2014) identified that children who stayed in adoptive placements scored significantly better on the SDQ behaviour index than those whose placement broke down. However Howe (1997) identified that an increase in behavioural problems was only found for children adopted later and in the context of early adverse care.

The research on whether adoptees experience more emotional difficulties is less clear. Children who experienced an adoptive placement breakdown displayed elevated scores compared to in-placement children on the short form of the Assessment Checklist for Adolescents (ACA-SF, Tarren-Sweeney, 2014). This checklist measures emotional, behavioural and inter-personal difficulties however it does not specifically assess mental health. On the ACA-SF a significant effect was observed for the following domains: non-reciprocal behaviour, social instability and dissociation/trauma (Selwyn et al., 2014). An increased likelihood of accessing mental health services has been observed for adopted children (Harwood, Feng & Yu, 2013; Miller, Fan, Grotevant, Christensen, Coyl & van Dulmen, 2000; Tan & Marn, 2013). But Miller et al (2000) and Warren (1992) noted that after controlling for level of difficulties, adopted children were twice as likely to attend Child and Adolescent Mental Health Services (CAMHS) than non-adopted children, suggesting that the increased likelihood of CAMHS attendance might relate to a referral bias as opposed to necessarily an increased rate of mental health problems. Van IJzendoorn and colleagues have completed a number of meta-analyses examining aspects of the emotional state of adoptees. They identified that children adopted after 12 months of age had less secure attachments compared to non-adopted children, however differences were not observed for children adopted prior to 12 months⁶. Domestically adopted children also displayed less disorganised attachment than post-

⁶ Parts of this analysis amalgamated both domestically and internationally adopted studies. This might make interpretation of findings more difficult given the potential for these populations to differ in early life experiences and later functioning.

institutionalised children (van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009). Additionally a meta-analysis of domestically and internationally adopted children found no differences in self-esteem between adopted and non-adopted children (Juffer & van IJzendoorn, 2007).

1.2.2 Cognitive difficulties

Although research focusing on domestically adopted children's cognitive functioning is limited, over the last 20 years there has been a surge in the number of studies and reviews examining the impact of childhood maltreatment or early life stress on cognitive functioning. As noted in section 1.1 the vast majority of children removed from biological families and placed for adoption are likely to have experienced maltreatment and early life stress, therefore this literature will be briefly discussed. Studies of maltreatment or early life stress have suggested a wide range of cognitive deficits on measures of: IQ, memory, working memory, executive functioning and attention (Carrey, Butter, Persinger & Bialik, 1995; Hart & Rubia, 2012; Nolin & Ethier, 2007; Pechtel & Pizzagalli, 2011). In addition neurobiological studies have shown evidence that extreme stress during developmentally sensitive periods can lead to profound and lasting neurobiological changes (Anda, Felitti, Bremner, Walker, Whitfield, Perry, et al., 2006; Chugani, Behen, Muzik, Juhász, Nagy & Chugani, 2001; Hanson, Adluru, Chung, Alexander, Davidson & Pollak, 2013; Hart & Rubia, 2012). A meta-analysis conducted by Van IJzendoorn, Juffer, & Poelhuis (2005) collated information regarding IQ and school functioning for internationally and domestically adopted children, these populations were analysed together. They identified that adopted children showed higher IQ scores than non-adopted siblings and peers who remained in the pre-adoption environment, and significant differences were not observed for siblings or peers within the same current environment. Furthermore IQ differences were not observed between children adopted pre and post 12 months of age. Adopted children were found to perform academically better than non-adopted siblings and peers who remained in the pre-adoption environment, but poorer than children within the same current environment. This effect appeared to be related to the age of adoption with only children adopted after 12 months showing an academic delay.

1.2.3 Social and peer difficulties

Whether adopted children display peer or social difficulties has been less widely studied. Parenting in early life has been shown to predict children's empathy, social competence and social engagement (Brody, McBride, Kim & Brown, 2002; Cheng, Dong & Zhou, 1997; Landry, Smith, Swank, & Guttentag, 2008; Lengua, Honorado & Bush, 2007; Zhou, Eisenberg, Losoya, Fabes, Reiser, Guthrie et al., 2002). Additionally later peer rejection has been associated with behavioural problems and aggression towards peers (Crick, Ostry, Burr, Cullerton, Jansen & Ralston, 2006). In accordance with this a study of internationally adopted children found that children identified as peer rejected or controversial had higher externalising scores on parent and teacher report measures (Juffer, Stams & van IJzendoorn, 2004). Sharma, McGue and Benson (1996) found that adoptive adolescents reported higher levels of pro-social behaviour, however reports from others were not gained to corroborate this behaviour. Recently Elam and colleagues (2014) suggested that an 'evocative genotype-environment association' exists between adopted children's social behaviours and adoptive parents' hostility. They identified that birth mothers low behavioural motivation predicted adopted toddler's low social motivation. Low social motivation in toddlers appeared to in turn impact on adoptive parents' hostility, which predicted later reports of disruptive peer behaviour.

1.3 Executive Functioning

A cognitive area that has become of increasing interest within the field of child maltreatment is executive functioning. Executive functioning is an umbrella term which encompasses a wide range of cognitive processes that govern purposeful goal-directed behaviour and how we respond to novel situations (Hughes, 2011). The executive functions have been implicated in playing a pertinent role in several aspects of a child's social and academic development for example the development of pragmatic skills (Blain-Briere, Bouchard & Bigras, 2014) and academic development, performance and learning (Bull, Espy, & Wiebe 2008; Cartwright, 2012; Gathercole, Pickering, Knight, & Stegmann, 2004). These executive functioning processes include "*anticipation, goal selection, planning, initiation of activity, self-regulation, mental flexibility, deployment of attention, and utilization of*

feedback.” (Anderson, 2002, p71). These skills appear to emerge at different stages from infancy to early adulthood along differing developmental trajectories (Best & Miller, 2010; Blakemore & Choudhury, 2006; Carlson, 2005; Cuevas & Bell, 2010; Dawson & Guare, 2010; Garon, Bryson, & Smith, 2008; Hoehl, Reid, Mooney & Striano, 2008; Hughes, 2011).

A handful of studies have assessed executive functioning in domestically adopted children. Leve et al (2013) identified positive associations between adopted toddler’s effortful attention with language development, birth mother verbal IQ and gender (female). Additionally, delay of gratification was positively associated with language development and gender (female). A history of placement instability has been suggested to impact inhibitory control performance when controlling for age and working memory performance (Lewis, Dozier, Ackerman, & Sepulveda-Kozakowski, 2007). Mueller et al (2012) examined the impact of monetary incentives on prosaccade and antisaccade tasks for adopted children and non-adopted controls. They identified that adopted children failed to show an improvement in performance on antisaccade trials that were incentivised. As this effect was not observed for incentivised prosaccade trials they concluded that this diminished reward sensitivity related to underlying inhibitory control deficiencies as opposed to a reduced attention capacity. In addition a group of children adopted before the age of 6 months were identified to display significantly better performance on executive functioning tasks compared to children adopted from psycho-socially depriving institutions (Beckett et al., 2010; Colvert, Rutter, Kreppner, Beckett, Castle, Groothues, Sonuga-Barke et al., 2008). However these studies did not include a non-adopted control group or comparisons to normative data therefore it is difficult to draw conclusions about how adopted children compare on these executive functioning tasks to non-adopted peers.

A much larger research base exists assessing the executive functioning of children adopted from psycho-socially depriving institutions. Studies employing the Behaviour Rating Inventory of Executive Functioning (BRIEF, Gioia, Isquith, Guy & Kenworthy, 2000) for children over 5 years of age have consistently identified above average executive functioning difficulties in this population (Groza, Ryan, & Thomas, 2008; Merz & McCall, 2011; Merz, McCall & Groza, 2013). Furthermore

reported executive functioning appears to be associated with duration of institutionalisation, with later adoption being linked to poorer abilities. There has been more variability in findings utilising laboratory or experimental tasks to assess executive functioning. Post-institutionalised children have shown reduced performance on tasks assessing: rule acquisition and manipulation (Bauer, Hanson, Pierson, Davidson & Pollak, 2009; Hanson et al., 2013; Pollak, Nelson, Schlaak, Roeber, Wewerka, Wiik et al., 2010), the retention and manipulation of spatial information (Bauer et al., 2009; Bos, Fox, Zeanah & Nelson, 2009; Hanson et al., 2013; Pollak et al., 2010), spatial span (Merz et al., 2013), inhibition (Cardona, Manes, Escobar, Lopez & Ibanez, 2012; Colvert et al., 2008; Eigsti, Weitzman, Schuh, de Marchena & Casey, 2011; Loman, Johnson, Westerlund, Pollak, Nelson & Gunnar, 2013; McDermott, Westerlund, Zeanah, Nelson & Fox, 2012), and selective and sustained auditory attention (Eigsti et al., 2011). Studies looking at planning abilities have been more inconstant with some suggesting difficulties (Bauer et al., 2009; Hanson et al., 2013) and others reporting no significant differences between post-institutionalised and non-adopted controls (Bos et al., 2009; Pollak et al., 2010).

1.4 Executive functioning and social communication skills

The term ‘social communication skills’ covers a range of socially directed behaviours including the ability to: initiate and maintain conversations, request information from others, listen to and respond to others, and appropriately interact in games or activities (Carter, Ornstein-Davis, Klin, & Volkmar, 2005). Social communication deficits make up one third of the triad of impairments commonly observed in individuals with Autistic Spectrum Disorders (ASD). However social communication deficits are also frequently seen in individuals who do not meet the criteria for ASD for example: individuals with psychosis (Dickinson, Bellack & Gold, 2007), following a traumatic brain injury (Coelho, Liles & Duffy, 1991; Dahlberg, Cusick, Hawley, Newman, Morey, Harrison-Felix et al., 2007; Marsh & Knight, 1991; McDonald & Flanagan, 2004), children with ADHD (Nijmeijer, Minderaa, Buitelaar, Mulligan, Hartman & Hoekstra, 2008; Nixon, 2001), and children with behaviour problems (Donno, Parker, Gilmour & Skuse, 2010; Gilmour, Hill, Place & Skuse, 2004).

As noted in section 1.2.3 it is unclear whether domestically adopted children demonstrate elevated rates of peer and social communication difficulties. However, a number of studies have identified social communication deficits and ‘quasi-autistic’ traits (Rutter, Anderson-Wood, Beckett, Bredenkamp, Castle, Groothues et al., 1999) in children adopted from socially depriving institutions. The term quasi-autistic traits was used as these children displayed “*a significantly greater degree of improvement between ages 4 and 6 years... unusual spontaneity and flexibility of communication... and an unusual degree of social approach*” (Rutter, Kreppner, Croft, Murin, Colvert, Beckett, Sonuga-Barke et al., 2007c, p1205). Colvert et al (2008) identified that 14% of a sample of Romanian orphans who were adopted after the age of 6 months displayed quasi-autistic traits, and interestingly longitudinal studies demonstrated that for many these quasi-autistic traits display some amelioration over time (Rutter et al., 2007c). In comparison none of a sample of children adopted from the UK prior to 6 months of age displayed quasi-autistic traits (Colvert et al., 2008). It is however unclear whether the lack of identified social communication difficulties in domestically adopted children was influenced by the earlier age of adoption.

In the aforementioned study conducted by Colvert and colleagues children who displayed quasi-autistic traits performed statistically significantly poorer on both a measure of executive functioning and theory of mind, suggesting that these abilities may play a mediating role in the quasi-autistic traits. The topic of theory of mind has been the most extensively researched in relation to executive functioning and associations between executive functioning and theory of mind abilities have been observed in both typically developing children and children with a range of clinical diagnoses including: autism, hyperactivity, conduct problems, traumatic brain injuries and foetal alcohol syndrome (Colvert et al., 2008; Hughes, 2011). Furthermore although executive functioning has been implicated more broadly in both ASD and aspects of social communication and interaction (Hill, 2004; McEvoy et al., 1993), the nature of the relationship remains unclear.

1.5 The current study

Given the likely importance of executive functioning and social communication on a child's social, emotional and academic development, this study will examine whether these are areas that adopted children display difficulties and consequently where adopted children and families might benefit from additional support. To date the majority of research on executive functioning and social communication ability in adopted children has focused on children adopted from non-UK psychosocially depriving institutions, which lack in consistent, responsive caregivers. Theoretically children adopted from foster care should have experienced less psychosocial deprivation, and possibly more active maltreatment, this may result in a different neuropsychological profile of strengths and weaknesses. As described previously, the few studies that have compared domestically adopted and post-institutionalised children have found less difficulties for the domestically adopted sample. However these studies have selected children adopted at a young age, typically prior to 6 months (e.g. Colvert et al, 2008; Pollak et al, 2010). In both the post-institutionalised and adoptive research younger age of adoption has been associated with fewer difficulties in a range of areas. Therefore the difference in scores between the post-institutionalised and adopted children could represent an age of adoption effect rather than a genuine lack of difficulties existing. Furthermore, as the average age of adoption is 3 years 5 months (DfE, 2014) the current research findings may not generalise well to the majority of the UK adopted population and may in fact underestimate the levels of difficulties experienced in this population.

The current study will address some of the aforementioned gaps in the domestically adopted literature. Specifically the objectives of this study are;

- 1) To clarify whether UK adoptees show executive functioning deficits akin to those observed in post-institutionalised children.
- 2) To examine whether executive functioning performance correlates with social communication traits.
- 3) To consider whether pre-adoption maltreatment related variables are linked with differences in executive functioning and social communication abilities.

4) To investigate whether executive functioning and social communication scores show 'recovery' following adoption.

2. Methods

2.1 Study Overview

2.1.1 Study Design

This study utilised a cross sectional design to observe the cognitive profile of a sample of domestically adopted UK children at a single point in time. The outcome variables of interest were executive functioning ability and social communication traits. Time since adoption, age of adoption and reported history of maltreatment were hypothesised to be potential predictor variables. In addition an overview of cognitive ability, mental health and ADHD symptoms were ascertained to control for these potentially confounding variables.

2.1.2 Power Analysis

A power analysis was computed through the G power program (Erdfelder, Faul, & Buchner, 1996) focusing on the primary hypothesis. This identified that 27 participants would be needed to discover a medium effect size of $d = 0.5$, with the probability of making a type one error being 0.05 and power being 0.80. A medium effect size was selected based on the current literature, for example Colvert et al (2008) discovered a medium to large effect ($\eta^2 = 0.12$) when comparing Executive functioning in Romanian orphans compared to control groups. In total 31 participants were recruited to take part in this study.

2.2 Participants

2.2.1 Recruitment

Participants opted into this study following reading the research advert (see appendix 1) which was published alongside an advertorial in the Adoption UK magazine. In addition adoption agencies linked with the Consortium of Voluntary Adoption Agencies (CVAA) circulated this advert via email. A total of 48 potential participants were identified through families enquiring about the study. Of these 48 participants three were excluded due to being outside of the study age range, 31 of the 45 potential participants (69%) completed the research assessment. Reasons for not taking part in the study included: travelling to the assessment being too difficult,

expensive or far, the child not wishing to take part in the research and parents not responding to follow up emails about the study. Of the 31 participants who completed the research assessment one was excluded from the analysis due to their IQ being assessed to be in the impaired range on the WASI-II (<70).

2.2.2 Inclusion and Exclusion Criteria

This study included children aged 7-11 years who were adopted from foster care within Britain. To be included in the study both the children and adoptive parents had to be proficient in English to a level where they could complete the assessment without an interpreter. Participants were excluded if they had a sensory impairment likely to significantly impede their performance on neuropsychological assessments (e.g. formally registered as deaf or blind). In addition children with a formal diagnosis of Autistic Spectrum Disorder (ASD) or a global learning disability were not included in the study.

2.2.3 Demographic information

Of the sample of 30 children included in the analysis, 60% (n=18) were male (mean age = 9.06 years, range 7 to 11.92 years). The majority of participants were classified ethnically as White British (80%, n = 24). Of the remaining 20%, 6.7% (n = 2) were classified as Black British, 6.7% (n = 2) as White Asian, 3.3% (n = 1) as Mixed African/European and 3.3% (n = 1) as Mixed Indian/White British. The mean length of time since the adoption order was granted was 5.4 years (range 1 to 9.4 years).

Figure 1- Demographics of the study sample

| | Sample (n = 30) |
|--------------------------------------|-----------------|
| Age in months (SD) | 108.80 (16.13) |
| Ethnicity % (n) | |
| <i>White British</i> | 80% (24) |
| <i>Black British</i> | 6.67% (2) |
| <i>White Asian</i> | 6.67% (2) |
| <i>Mixed African/European</i> | 3.33% (1) |
| <i>Mixed Indian/White British</i> | 3.33% (1) |
| Gender % (n) | |
| <i>Male</i> | 60% (18) |
| <i>Female</i> | 40% (12) |
| Age left birth family in months (SD) | 18.70 (19.78) |

| | |
|--|---------------|
| Age adoption order granted in months (SD) | 46.97 (23.43) |
| Time since adoption order granted in months (SD) | 64.23 (25.32) |
| Reported experience of abuse (%) | 24 (80%)* |

*n = 27, 3 adoptive parents did not know this information.

2.3 Assessment Measures

2.3.1 Mental health screening

For each participant one adoptive parent was asked to complete the online parental interview for the Development and Well-Being Assessment (DAWBA; Goodman, Ford, Richards, Gatward & Meltzer, 2000) within 1 month prior to the research assessment date. The DAWBA was used as a screen for psychiatric symptoms and associated functional impairments. Due to the potential for ADHD difficulties to produce false positives on measures of executive functioning (Hughes and Graham, 2002), the DAWBA was additionally employed to measure and extract ADHD symptoms, enabling this to be controlled for in the analysis. The DAWBA has been used extensively both clinically and in research (e.g. Ford, Vostanis, Meltzer, & Goodman, 2007; Meltzer, Gatward, Goodman & Ford, 2000; Meltzer, Gatward, Corbin, Goodman & Ford, 2003). It has demonstrated strong validity in differentiating clinical and non-clinical samples (Fleitlich-Bilyk & Goodman, 2004; Goodman et al, 2000) and accuracy in predicting mental health conditions (e.g. Fleitlich-Bilyk & Goodman, 2004; Foreman et al., 2009; Goodman et al., 2000). The Strength and Difficulties Questionnaire (Goodman, 1997) and the likelihood of specific diagnoses were extracted from the DAWBA to quantify emotional and behavioural difficulties. The SDQ provides a score of total emotional and behaviour problems ('abnormal' cut-off ≥ 17) as well as a report of the following sub-scales; emotional problems (cut-off ≥ 5), behavioural problems (cut-off ≥ 4), hyperactivity (cut-off ≥ 7), peer problems (cut-off ≥ 4) and pro-social behaviour (cut-off ≤ 4) (see Goodman, 2001 for a description of psychometric properties of the SDQ).

2.3.2 General cognitive ability

The second version of the Wechsler Abbreviated Scale of Intelligence (WASI-II; Wechsler, 2011) was administered to gather an overview of cognitive ability and IQ.

The WASI-II consists of 4 sub-tests, which measure crystallised abilities, non-verbal fluid abilities and visuomotor/coordination skills. The WASI-II enabled IQ to be controlled for in the analysis as well as identifying children presenting with significant impairments of intellectual functioning to be excluded from the analysis. The WASI-II has been standardised on a large sample of children and has demonstrated concurrent validity with longer assessments of IQ (Wechsler, 2011). In addition the WASI-II is reported to demonstrate acceptable to excellent test-retest stability with children (.79-.90) and excellent inter-rater reliability (.94-.99) (Wechsler, 2011).

2.3.3 Executive functioning

It has been suggested that laboratory and report measures should be used in combination to assess executive functioning as they may capture slightly different aspects of functioning (e.g. cognitive versus related emotional and social elements), and functioning in differing environmental situations (Goldstein & Naglieri, 2013). As a result, executive functioning was measured via both parental report and a laboratory assessment.

One parent was asked to complete the Behavior Rating Inventory of Executive Functioning (BRIEF; Gioia et al., 2000). The BRIEF produces three scales: the Global Executive composite (GEC), Behavioural Regulation (BRI) and Metacognition (MI). It has demonstrated high internal consistency (Cronbach α scores between .80-.98) and confirmatory factor analyses have supported the validity of the BRIEF as a measure of executive functioning consistent with theoretical models of executive functioning (Gioia, et al., 2000; Gioia, Isquith, Retzlaff & Espy, 2002; Gioia, Kenworthy & Isquith, 2010). Additionally, the BRIEF has been hypothesised to be a more ecologically valid measure of executive functioning (Gioia and Isquith, 2004).

Participants completed four sub-tests from the Cambridge Neuropsychological Test Automated Battery (CANTAB, Cambridge Cognition); Paired Associate Learning (PAL), Spatial Working Memory (SWM), Stocking of Cambridge (SOC), and Intra-Extra Dimensional Shift (IED). These sub-tests were selected as performance

difficulties have been observed on these tests for children adopted from socially depriving institutions (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Merz et al., 2013; Pollak et al., 2010). The four sub-tests selected are hypothesised to measure visual memory and executive functioning. The CANTAB has been well validated for use with children of this age range and high internal consistency coefficients were reported (.73-.95) (Luciana and Nelson, 2002), however Syväoja, Tammelin, Ahonen, Räsänen, Tolvanen, Kankaanpää & Kantomaa (2014) reported the individual sub-tests to range from unreliable and inconsistent to acceptable and moderately-good level of reliability. A range of studies have demonstrated the construct and discriminant validity for children (see Henry & Bettenay, 2010).

2.3.4 Social communication traits

Social communication traits were assessed via parental report, one parent was asked to complete the Social Communication Questionnaire – current version (SCQ; Rutter, Bailey & Lord, 2003). On the SCQ the recommended cut-off for further ASD screening is >15 (Rutter et al., 2003). The SCQ has shown good discriminative validity between ASD and other non-Autistic disorders in children over the age of 4 years (Berument, Rutter, Lord, Pickles & Bailey, 1999; Chandler, Charman, Baird, Simonoff, Loucas, Meldrum et al., 2007). Correlations with longer ASD assessment tools such as the Autism Diagnostic Interview- Revised (ADI-R; Rutter, Le Couteur & Lord, 2005) have been found between .50 and .71 (Berument et al., 1999; Hanson et al., 2002).

2.3.5 Demographic variables

Demographic data was collected using questions extracted from a questionnaire developed in partnership with Adoption UK service users, they reported this questionnaire to be well tolerated and appropriate for use with adopted parents (see appendix 2). The demographic questionnaire gathered information on variables that might have influenced performance on the cognitive, emotional and social assessment measures, enabling these to be included in the analysis. For example: age the child left the birth family, age of adoption, time since adoption, and reported history of abuse.

2.4 Procedure

Following gathering ethical consent from both the parent and child the face-to-face assessment was conducted with either the primary researcher or a research assistant trained in administering the measures. The assessment took approximately 2 hours and allowed time for at least one break, parents were asked to remain in the waiting area to decrease potential distractions. All assessments were conducted at either the IoPPN campus or a nearby NHS children's outpatient centre. To reduce the effects of fatigue the CANTAB and WASI-II were counter-balanced in their order of administration, with half of the participants completing the CANTAB first and the other half beginning with the WASI-II. Whilst the assessment was occurring one parent was asked to complete the SCQ, demographic questionnaire and the BRIEF, the DAWBA access codes were sent prior to the assessment once the family had opted in to the study.

2.4.1 Piloting

An initial pilot was conducted with the first participant to identify any problems with the procedure and measures. In this assessment a fifth sub-test from the CANTAB was administered (Delayed Match to Sample, DMS). Following this pilot it was felt that the assessment was too long for the younger participants. Hence the DMS CANTAB sub-test was removed from the procedure to decrease the effects of fatigue, this sub-test was selected to be removed as it had been used less in previous literature and it predominantly measured sustained attention which could be ascertained through the parental report measures as well as clinical observation. No further concerns were noted.

2.5 Ethical issues

2.5.1 Ethical approval

Ethical approval was sought and granted from King's College London Research Ethics Committee (reference number PNM/13/14-117, see appendix 3). Following

approval a minor modification was requested and permitted to broaden the number of Adoption agencies that recruitment could occur through (see appendix 4).

2.5.2 Informed consent

Prior to the assessment two information sheets were sent to the families, one for the parents and an age appropriate version for the child (see appendices 5 and 6), these briefly described the research and the layout of the assessment. Parents were encouraged to ask any questions about the information sheets either via email or to arrange a time to discuss the research further. At the assessment families were given a brief overview of the assessment and time to ask any further questions. Following this, informed consent was gained from both the parents and the child (see appendices 7 and 8). It was reiterated to the families that they were free to terminate the assessment at any point and to withdraw from the study without any repercussions.

2.5.3 Feedback

Feedback was provided in the form of a personalised summary of their child's performance on the CANTAB, the WASI-II as well as an overview of their DAWBA scores (see appendix 9 for an example research summary). This report was sent to families within one month of the research assessment and following the return of all completed parental report measures.

2.5.4 Data protection

The requirements of the Data Protection Act were complied with throughout the study. Participants were allocated ID numbers and where possible data was anonymised. Data was stored in a locked filing cupboard and was not removed from the IoPPN campus. Any potentially identifiable computer data was kept in password-protected documents and stored on a password-protected USB drive.

2.6 Data analysis plan

The collected data was coded and entered into a database using IBM SPSS Statistics 22, all parts of the analysis was conducted using this program. To reduce the need for multiple analyses it was planned that a composite executive functioning score would be calculated including both the CANTAB executive functioning sub-tests and the overall BRIEF score. However, due to the small correlations between the CANTAB sub-tests and the BRIEF this composite was not created. To complete the primary objective of the study and assess whether children adopted from UK foster care showed executive functioning deficits compared to normative data, one-sample t-tests were run between executive functioning measures and normative data. For the second objective bivariate correlations were run to look for a relationship between SCQ and executive functioning scores. To complete the third objective bivariate correlations were used to determine the impact of pre-adoption maltreatment related variables on outcome measures. Partial correlations were also used to control for variables identified as potentially influencing outcome measures (ADHD symptoms and gender). Furthermore, independent samples t-tests were used to identify statistically significant within group differences related to history of maltreatment. With regards to the final aim bivariate correlations were used to determine the impact of time since adoption on outcome measures, partial correlations were also used to control for variables identified as potentially influencing outcome measures (ADHD symptoms and gender).

3. Results

3.1 Participant characteristics

3.1.1 Mental health screen

The SDQ was extracted from the parent completed DAWBA data to gain an overview of the emotional and behavioural functioning of the included participants. This adopted sample demonstrated more difficulties on all SDQ scales compared to the national norms⁷. This difference reached statistical significance for the following scales: emotional symptoms, conduct problems, hyperactivity, prosocial, total difficulties and impact. Effect sizes (ES) were calculated using the mean, standard deviation and participant numbers for the research group and normative data. The calculated ES ranged from $r=.12$ (small) to $r=.80$ (large) (see figure 2). Independent samples t-tests revealed no statistically significant differences between male and female participants on any of the SDQ scales.

Figure 2 - The SDQ data for the adopted sample compared to normative data.

| | Adopted sample (n=30) | | National norms (n=10298) | | Difference | ES (r) |
|----------------------|--------------------------|-----|-----------------------------|-----|------------|--------|
| SDQ scale | Mean | SD | Mean | SD | | |
| Emotional symptoms* | 3.2 | 2.7 | 1.9 | 2.0 | $p=.015$ | .31 |
| Conduct problems** | 3.3 | 2.3 | 1.6 | 1.7 | $P<.001$ | .45 |
| Hyperactivity** | 6.6 | 3.4 | 3.5 | 2.6 | $p<.001$ | .51 |
| Peer problems | 1.9 | 2.2 | 1.5 | 1.7 | $p=.299$ | .12 |
| Prosocial scale* | 7.5 | 2.5 | 8.6 | 1.6 | $P<.017$ | .32 |
| Total difficulties** | 15.1 | 7.9 | 8.4 | 5.8 | $p<.001$ | .50 |
| Impact score** | 3.3 | 2.8 | 0.4 | 1.1 | $p<.001$ | .80 |

National norms for children aged 5-15 years are drawn from Meltzer et al., 2000

* One-sample T-tests demonstrated that the adopted group performed significantly poorer than normative data ($p<.05$)

** One-sample T-tests demonstrated that the adopted group performed significantly poorer than normative data ($p<.001$)

⁷ As the age range of participants in this study fell across more than one age band on the SDQ norms the total national norms were used for comparisons.

3.1.2 Cognitive Functioning

Adopted participants scored within the average range for all WASI-II scales (see figure 3). IQ scores on the WASI-II have a mean of 100 and a standard deviation of 15. A one-sample t-test identified the mean PRI score to be statistically significantly below the norm of 100 ($t(29)=-237$, $p=.025$). No other significant differences were identified.

Figure 3 - Shows the WASI-II data for all participants compared to normative data

| WASI-II Scale ⁸ | Mean | SD | Range | Description | Difference | ES (r) |
|----------------------------|--------|-------|--------|-------------|------------|--------|
| FSIQ | 96.93 | 13.70 | 74-140 | Average | $p=.230$ | .10 |
| VCI | 100.67 | 15.30 | 68-149 | Average | $p=.813$ | .02 |
| PRI | 94.07 | 13.72 | 64-126 | Average | $p=.025$ | .19 |

3.2 Data analysis

Prior to analysis the assumption of normality was met for all assessment measures (see appendix 10 for skew and kurtosis scores), as a result no data transformations were performed.

3.2.1 Executive functioning

To test whether children adopted from UK foster care show executive functioning deficits compared to normative data one-sample t-tests were completed for all measures of executive functioning. On the BRIEF questionnaire all index scores were found to be significantly above normative values⁹: BRI ($t(29)=6.2$, $p=.000$), MI ($t(29)=5.8$, $p=.000$), and GEC ($t(29)=6.4$, $p=.000$). Medium to large effect sizes were observed ($r=.47-.51$). Additionally a statistically significant difference was observed for two of the CANTAB executive functioning sub-tests¹⁰: IED total errors adjusted ($t(29)=-2.93$, $p=.007$) and SWM between errors ($t(29)=-4.26$, $p=.000$). A difference

⁸ The normative data for all children was used in these comparison ($n=1,100$).

⁹ The total normative data for children age 5-18years was used in comparisons, this was gained from Gioia et al (2000), $n=1,419$

¹⁰ Test performance was compared to the CANTAB internal normative data and matched to age. This normative data is drawn from the results of 3000 healthy participants aged 4 to 90 years.

was not observed for the executive functioning sub-test SOC ($t(25)=-1.59$, $p=.13$) or the memory task PAL ($t(26)=.35$, $p=.73$). Small to medium effect sizes were observed ($r=.03$ - $r=.37$).

Figure 4 - The mean scores on measures of executive functioning

| | Mean | SD | Description | Difference | ES (r) |
|---|-------|-------|-------------|------------|-----------|
| BRIEF^a | | | | | |
| Behavioral Regulation Index (BRI) | 65.63 | 13.85 | Elevated | $p<.001$ | .50 |
| Metacognition Index (MI) | 63.37 | 12.64 | Average | $p<.001$ | .47 |
| Global Executive Composite (GEC) | 65.33 | 13.11 | Elevated | $p<.001$ | .51 |
| CANTAB^b | | | | | |
| IED (<i>total errors adjusted</i>) | -0.45 | 0.84 | Average | $p=.007$ | .22 |
| SOC (<i>problems solved in minimum moves</i>) | -0.29 | 0.94 | Average | $p=.125$ | .14 |
| SWM (<i>between errors</i>) | -0.79 | 1.02 | Low average | $p<.001$ | .37 |
| PAL (<i>total errors adjusted</i>) | 0.05 | 0.77 | Average | $p=.726$ | .03 |

^a The BRIEF T-scores are presented here, mean T score = 50, SD = 10.

^b CANTAB scores are presented as z-scores, mean = 0, SD = 1.

As displayed in figure 5 correlations between CANTAB executive functioning sub-tests and the BRIEF ranged from $r=.01$ to $r=.44$, and varied in direction. As a result an overall executive functioning composite was not created and analyses were performed separately on the BRIEF GEC and CANTAB executive functioning sub-tests.

Due to the known impact of ADHD on executive functioning, all executive functioning measures were correlated with the SDQ hyperactivity sub-scale and the DAWBA likelihood of meeting criteria for the diagnosis of ADHD. As figure 5 shows, the SDQ and DAWBA ADHD variables were significantly correlated with all BRIEF indices ($r=.48$ - $r=.95$). However, weak correlations were observed between measures of ADHD and all CANTAB tasks ($r =.01$ – $r=.17$). As a result ADHD will be controlled for in the BRIEF analysis but not the CANTAB analysis. As difficulties were not observed on the CANTAB memory task (PAL), this was not included in later analyses.

Figure 5 - Displays the Pearson's r correlation values for measures of ADHD and executive functioning

| | <i>ADHD DSM-IV</i> | <i>SDQ hyperacti vity scale</i> | <i>BRIEF GEC</i> | <i>BRIEF MI</i> | <i>BRIEF BRI</i> | <i>CANTAB SOC</i> | <i>CANTAB SWM</i> | <i>CANTAB IED</i> | <i>CANTAB PAL</i> |
|---|------------------------|---|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <i>ADHD DSM-IV</i> | 1 | .93** | .76** | .84** | .53** | -0.02 | -0.12 | -0.08 | -0.14 |
| <i>SDQ hyperacti vity scale</i> | .93** | 1 | .72** | .81** | .48** | 0.01 | -0.13 | 0.03 | -0.17 |
| <i>BRIEF GEC</i> | .76** | .721** | 1 | .95** | .90** | 0.06 | -0.16 | 0.01 | -0.08 |
| <i>BRIEF MI</i> | .84** | .81** | .95** | 1 | .73** | -0.04 | -0.24 | -0.02 | -0.12 |
| <i>BRIEF BRI</i> | .53** | .48** | .90** | .73** | 1 | 0.20 | -0.01 | 0.02 | -0.03 |
| <i>CANTAB SOC</i> | -0.02 | 0.01 | 0.06 | -0.04 | 0.20 | 1 | .44* | 0.24 | 0.05 |
| <i>CANTAB SWM</i> | -0.12 | -0.13 | -0.16 | -0.24 | -0.01 | .44* | 1 | 0.14 | .43* |
| <i>CANTAB IED</i> | -0.08 | 0.03 | 0.01 | -0.02 | 0.02 | 0.24 | 0.14 | 1 | 0.05 |
| <i>CANTAB PAL</i> | -0.14 | -0.17 | -0.08 | -0.12 | -0.03 | 0.00 | .431* | 0.05 | 1 |

*p<.05

**p<.01

Independent samples t-tests identified no statistically significant differences between male and female participants on the BRIEF GEC ($t(28)=.85$, $p=.403$) or any of the CANTAB executive functioning tasks (IED ($t(28)=1.15$, $p=.260$), SOC ($t(28)=-.63$, $p=.534$), SWM ($t(28)=.28$, $p=.783$), therefore gender was not controlled for in the executive functioning analysis. Additionally statistically significant correlations were not observed between FSIQ and the BRIEF GEC ($r=.19$) or any of the CANTAB executive functioning sub-tests ($r=-.04$ – $r=.29$), so this was not controlled for in later executive functioning analyses. See appendix 11 for an overview of correlations between demographic variables and assessment tools.

3.2.2 BRIEF ratings

All BRIEF correlations were performed controlling for ADHD symptoms as measured by the DAWBA. A significant correlation was not found between the BRIEF GEC and age left birth family home ($r_p = -.27$, $p = .160$) or time since adoption ($r_p = .23$, $p = .227$). Furthermore no significant correlation was observed between age of assessment and the BRIEF GEC ($r_p = -.08$, $p = .683$). A statistically significant correlation was observed between the BRIEF GEC and age adopted ($r_p = -.42$, $p = .025$), however this failed to reach statistical significance when the Bonferroni correction was manually applied to adjust for the multiple correlations.

3.2.3 CANTAB executive functioning performance

No statistically significant correlations were observed between the CANTAB IED task and age left birth family ($r = -.19$, $p = .318$), age adopted ($r = -.11$, $p = .554$) and time since adoption ($r = -.22$, $p = .245$). CANTAB IED performance did correlate with age ($r = -.40$, $p = .028$) however this did not remain significant following controlling for multiple comparisons using the Bonferroni correction.

No statistically significant correlations were observed between the CANTAB SOC sub-test and demographic variables: age ($r = -.14$, $p = .504$), age left birth family ($r = .20$, $p = .330$), age adopted ($r = .13$, $p = .514$) and time since adoption ($r = -.25$, $p = .210$).

A similar pattern was found for the CANTAB SWM sub-test, no significant correlations were observed with: age ($r = -.10$, $p = .586$), age left birth family home ($r = .19$, $p = .318$), age adopted ($r = -.18$, $p = .253$), and time since adoption ($r = -.23$, $p = .228$).

3.2.4 Social communication traits

On the SCQ none of the participants scored above the recommended cut-off for further ASD screening (mean 4.7, $SD = 3.7$, range 0-12). Controlling for ADHD, SCQ scores were found to correlate strongly with the BRIEF GEC ($r_p = -.64$, $p = .000$), with lower SCQ scores being associated with better executive functioning scores. However this effect was not replicated for any of the CANTAB executive

functioning sub-tests ($r=-.01$ – $r=.17$). In addition statistically significant between gender differences were observed on SCQ scores ($t(28)=1.68$, $p=.04$). As a result gender was controlled for in any significant correlations. FSIQ was not found to correlate with SCQ scores ($r=-.07$, $p=.714$) and therefore was not controlled for.

Figure 6 - SCQ scores separated by gender

| Gender | Mean | SD |
|---------------|------|------|
| Male (n=18) | 6.61 | 4.04 |
| Female (n=12) | 3.33 | 2.84 |

3.2.5 Predictors of SCQ scores

No significant correlations were found between SCQ scores and: age ($r=.036$, $p=.849$), time since adoption ($r=-.19$, $p=.319$) and age left birth home ($r=.22$, $p=.241$). A significant correlation was observed between age adopted and SCQ score, this effect remained when gender was controlled for ($r_p=.41$, $p=.028$). However, this effect did not remain significant following controlling for multiple comparisons using the Bonferroni correction.

3.2.6 Impact of reported history of abuse

The profiles of scores were compared across the participants reported to have experienced abuse in the biological home ($n = 24$) versus those with no known history of abuse ($n = 3$). Children without a history of abuse performed better on the two of the three CANTAB executive functioning sub-tests, BRIEF GEC, WASI-II, SDQ and SCQ (figure 7) however, none of these differences were found to be statistically significant through independent samples t-tests ($p>.05$). Medium effect sizes were observed for the SCQ and SDQ total scores.

Figure 7 - Displays the profile of scores divided into children with and without histories of abuse.

| Measure | History of abuse (n=24) | No history of abuse (n=3) | Difference | ES (r) |
|------------|----------------------------|------------------------------|------------|--------|
| CANTAB SOC | -.27 (1.03)* | -.42 (.40) | -0.15 | .07 |
| CANTAB SWM | -.72 (.99) | -.51 (.38) | .21 | .11 |
| CANTAB IED | -.42 (.76) | -.04 (1.61) | .38 | .22 |

| | | | | |
|-----------------|---------------|---------------|-------|-----|
| SCQ total score | 5.29 (3.91) | 2.00 (1.73) | -3.29 | .40 |
| BRIEF GEC | 65.54 (13.16) | 57.33 (15.63) | -8.21 | .29 |
| WASI-II FSIQ | 95.54 (11.69) | 100.00 (2.65) | 4.46 | .20 |
| SDQ total score | 15.08 (7.51) | 8.00 (6.56) | -7.08 | .43 |

* n = 21

3.2.6 Post-Hoc comparisons

Due to the above average levels of reported difficulties on the SDQ, correlations were run to assess whether these difficulties impacted on the assessments of executive functioning and social communication traits. Correlations were run between the total SDQ score with the BRIEF GEC, the CANTAB executive functioning sub-tests and the total SCQ score. No relationship was found between the total SDQ score and any of the CANTAB executive functioning sub-tests ($r = -.01$ – $r = -.14$). A strong correlation was found between the SDQ and the BRIEF GEC ($r = .67$, $p = .000$), however following controlling for ADHD this correlation changed direction and no longer remained statistically significant ($r_p = -.35$, $p = .066$). In addition a moderate correlation was found between the total SDQ and the total SCQ scores, this effect remained following controlling for gender ($r_p = .42$, $p = .02$).

4. Discussion

4.1 Summary

This study examined the executive functioning, social communication and mental health of a sample of children adopted from UK foster care. In this study the adopted sample displayed difficulties in several aspects of executive functioning as measured by both laboratory and parental report measures. A statistically significant difference in performance compared to normative data was observed on the two of the three CANTAB executive functioning tasks (SWM and IED), with participants scoring lower than the normative sample. In addition, the adopted children were rated as displaying significantly more executive functioning difficulties than normative data via parental report. These difficulties were observed in the context of preserved overall cognitive ability (measured by the WASI-II) and visual memory and learning (measured by the CANTAB PAL). None of the pre or post adoption variables significantly correlated with executive functioning performance. However, controlling for ADHD symptoms age adopted correlated strongly with the BRIEF GEC, with older age being associated with less reported difficulties. Furthermore age at assessment was strongly correlated with CANTAB IED performance.

In terms of social communication traits all participants scored below the recommended cut-off of 15 on the SCQ. Parental ratings of social communication traits and executive functioning difficulties were strongly correlated, however SCQ scores and CANTAB performance failed to display a correlation. Males were rated as displaying significantly more social communication traits, and a moderate correlation was observed between SCQ scores and age adopted, with children adopted later showing more SCQ traits even after controlling for gender.

On the SDQ, participants were reported to display statistically significantly more difficulties than the normative sample. This was observed for: emotional problems, conduct problems, hyperactivity, pro-social behaviours, total difficulties and level of impact. SDQ difficulties correlated strongly with the other parental report measures of executive functioning and social communication traits, however a correlation with CANTAB performance was not observed. Of note, all parent report measures were

found to strongly correlate (see appendix 11). This could be an indication that these areas of functioning correlate strongly or that measures are assessing common factors or even similar biases in reporting (this is discussed further in section 4.3).

80% of the sample were reported to have experienced maltreatment in the past. History of reported abuse demonstrated an impact on SDQ, SCQ, WASI-II, BRIEF and CANTAB SWM and IED performance, with better scores being observed for children without an abuse history. Although these differences were not statistically significant, medium effect sizes were observed for the SCQ and SDQ total scores, suggesting that quality of early experiences might impact on later reported social, emotional and behavioural functioning. However this analysis was limited by the small number of participants reported to either not have experienced abuse (n=3) or whose history was unknown (n=3).

4.2 Results in context of literature

4.2.1 Executive functioning performance

Currently no published studies have reported the performance of UK children adopted from foster care on either the executive functioning sub-tests of the CANTAB or the BRIEF. As a result there is not a strong existing literature base to compare these results to. However, findings of this study are in line with the two studies that suggested inhibitory control difficulties in this population (Lewis et al., 2007; Mueller et al., 2012). Additionally the results of this study were in accordance with the current literature assessing CANTAB and BRIEF performance in post-institutionalised children (e.g. Bauer et al., 2009; Bos et al., 2009; Groza et al., 2008; Hanson et al., Merz & McCall, 2011; Merz et al., 2013a; Pollak et al., 2010). This study observed a similar pattern of difficulties on the CANTAB SWM and IED tasks (Bauer et al., 2009; Bos et al., 2009; Hanson et al., 2013; Pollak et al., 2010) alongside a lack of impairment on the SOC sub-test (Bos et al., 2009; Pollak et al., 2010). However, results for the SOC sub-test have been more variable with two studies reporting post-institutionalised children to perform poorer than non-adopted controls (Bauer et al., 2009; Hanson et al., 2013), therefore further clarification is necessary to determine whether these populations display planning difficulties. In

addition the parental reported difficulties on the BRIEF corresponded with the post-institutionalised studies described in section 1.3 (Groza et al., 2008; Merz & McCall, 2011; Merz et al., 2013a).

4.2.2 Age of adoption and influence on later development

In line with the current research age of adoption was explored as a proxy for duration of maltreatment. In the current study there was no association between the age of adoption and CANTAB performance, however a strong negative association was identified with BRIEF scores (when controlling for ADHD symptoms). This finding is largely inconsistent with the literature on post-institutionalised children where younger age of adoption has been associated with improved executive functioning performance on parental report measures (Groza et al., 2008; Jacobs et al., 2010; Merz & McCall 2011; Merz et al., 2013a; Merz et al., 2013b), and laboratory assessment tools (Colvert et al., 2011; Eigsti et al., 2011; Loman et al., 2013; Merz et al., 2013c; Tottenham, Hare, Quinn, McCarry, Nurse, Gilhooly et al., 2010). Although at first this effect may appear counterintuitive, it might reflect that children are more likely to be removed from birth families at an earlier age (and as a result placed for adoption sooner) due to maternal drug or alcohol abuse in utero or more severe and identifiable forms of early maltreatment. It may be that these stronger experiences of maltreatment are in turn associated with executive functioning difficulties. However, no notable correlations were observed between age removed from birth family home and executive functioning, which the previous hypothesis would expect. Furthermore, reported history of abuse did not significantly affect executive functioning performance.

While there was no positive association between age of adoption and the executive functioning measures, a large ($r=.40$) correlation was found between age of adoption and SCQ scores, with children adopted at a later age displaying more social communication traits. This finding is in line with outcomes from the ERA studies that identified a step-wise increase in ‘quasi-autism’ in Romanian orphans adopted after the age of 6 months (Colvert et al., 2008; Kreppner, Rutter, Beckett, Castle, Colvert, Groothues et al., 2007). In these studies none of the children in the comparison group adopted from the UK prior to 6 months of age displayed quasi-

autistic traits. For a portion of these post-institutionalised children these traits showed gradual diminishment from age 4 to 11 years (Rutter, Beckett, Castle, Colvert, Kreppner, et al., 2009). In contrast in this study no correlation was observed between time since adoption and SCQ scores, but as this sample of children were not scoring above the cut-off threshold and there may have been less potential 'recovery' to display.

This study failed to find a correlation between age of adoption and elevated levels of behavioural or emotional difficulties as measured by the SDQ. Older age of placement for adoption has been tentatively associated with elevated levels of behavioural and emotional difficulties as measured by the SDQ (Biehal et al., 2010), however Howe (1997) identified that an increase in behavioural problems was only found for children adopted later and in the context of early adverse care. This study did not measure quality of care although a medium effect size was found when comparing the impact of history of abuse on SDQ scores.

One explanation for the lack of strong correlations between age of adoption and outcome measures is that duration of hypothetical maltreatment is not the best predictor of cognitive and social development. Other pre-adoption variables, such as the quality of care received or 'dose' of maltreatment, are also likely to be important. Childhood maltreatment in the context of both remaining with and being removed from birth families has been associated with difficulties in executive functioning (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008; Cicchetti, 2002; De Bellis, 2005; Hughes, 2011; Pears, Fisher, Bruce, Kim & Yoerger, 2010), social skills (Shonk & Cicchetti, 2001) and mental health (Anda et al., 2006; Gilbert, Widom, Browne, Fergusson, Webb & Janson, 2009; Howe, 1997). A study of over 17,000 adults identified an association between the number of retrospectively reported adverse childhood experiences and poorer outcomes in terms of reported: mental health, somatic disturbances, impaired memory of childhood, sexuality and perceived stress, difficulty controlling anger, and the risk of perpetrating intimate partner violence (Anda et al., 2006). Additionally positive correlations between ratings of quality of institutional environment and executive functioning scores, and time spent with birth family before adoption and executive functioning scores have been identified (Hostinar et al., 2012). Quality of pre-adoption care is difficult to measure

retrospectively and as a result this was not explicitly measured in this study. Nonetheless a potential impact of abuse history on SDQ and SCQ scores was noted in this study.

4.2.3 Social communication traits and executive functioning

As introduced in section 1.2.3 executive functioning abilities have been associated with social communication skills. In accordance with previous studies (e.g. Colvert et al., 2008; McEvoy et al., 1993) this study identified a strong correlation between the SCQ and BRIEF with a greater number of social communication traits being associated with more reported executive functioning difficulties. In line with this the BRIEF has previously been found to associate with ratings of: communication, socialisation and social skills (Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002; Janusz, Ahluvalia, & Gioia, 2002), and observations of ASD symptoms (Kenworthy, Black, Harrison, Della Rosa & Wallace, 2009). Of interest no significant correlations were observed between the SCQ and CANTAB performance. A relationship between CANTAB performance and ASD traits has been inconstantly found in the literature to date. Studies such as Kaufman, Zotter, Pixner, Starke, Haberlandt, Steinmayr-Gensluckner et al (2013), Steele, Minshew, Luna & Sweeney (2007) and Ozonoff, Cook, Coon, Dawson, Joseph, Klin et al (2004) have identified differential performance in high functioning individuals with ASD and controls on the CANTAB SOC, SWM and IED tasks and associations between degree of social communication impairment and IED scores. Equally other studies have failed to replicate these effects (e.g. Ozonoff & Strayer, 2001). The lack of association observed between performance on these sub-tests and SCQ scores in this study might partially reflect that none of the children were demonstrating high levels of social communication difficulties, or that an association truly does not exist between these items.

4.3 Strengths and limitations of the current study

Executive functioning deficits have been consistently observed in children with ADHD on a range of assessment tools with the greatest difficulties being observed in tasks assessing response inhibition, working memory, planning and vigilance (Glass, Ware, Crocker, Deweese, Coles, Kable et al., 2013; Willcutt, Doyle, Nigg, Faraone,

& Pennington, 2005). As this sample displayed significantly higher scores on the hyperactivity sub-scale of the SDQ one might question whether difficulties observed on the CANTAB and BRIEF reflected attention and hyperactivity problems as opposed to a distinct executive functioning impairment. The SDQ hyperactivity sub-scale and DAWBA likelihood of meeting the DSM-IV criteria for ADHD correlated strongly with BRIEF reported difficulties, suggesting that they might be assessing related or shared difficulties (see figure 5 for correlations). However, significant correlations were not found between either measure of ADHD and performance on the CANTAB executive functioning sub-tests. Performance on the CANTAB SWM, SOC and IED tasks have continually been shown to be impacted by ADHD (Chamberlain et al., 2011; Fried et al., 2015; Glass et al., 2013) and SWM is one of the core sub-tests within the CANTAB ADHD assessment battery. Therefore if executive functioning difficulties in this study reflected solely ADHD symptoms then a correlation would be expected between the CANTAB scores and measures of ADHD symptoms.

A potential limitation of this study could be the measures used to assess executive functioning. The lack of strong correlations between the executive functioning measures reflects the diversity of the executive functioning construct, and associated difficulties in assessing it. The CANTAB was selected since it is a well validated for this age range (Luciana & Nelson, 2002) and it has been used in a number of studies examining executive functioning in children adopted from institutions. However, executive functioning assessment tools have been criticised for lacking ecological validity as individuals with frontal lobe impairments have demonstrated intact performance on executive functioning tasks but debilitating difficulties in daily life (e.g. Eslinger & Damasio, 1985; Levine, Robertson, Clare, Carter, Hong, Wilson et al., 2000). This might in part reflect the general structure of neuropsychological assessments, which are designed to enable optimal functioning and may be unrepresentative of performance in everyday settings, such as school. Additionally, Ozonoff (1995) noted that computerised tasks might be less sensitive to executive functioning deficits in clinical populations. A strength of this study is that it used a more ecologically valid tool (the BRIEF) alongside the experimental tasks to gain a broader picture of functioning. However, evidence has been varied as to whether the BRIEF correlates with direct tests of executive functioning. Parrish and colleagues

(2007) identified high correlations between the BRIEF and D-KEFS for children with epilepsy. In contrast McAuley, Chen, Goos, Schachar, & Crosbie, (2010) found weak correlations between the BRIEF and direct executive functioning tasks, but strong correlations with parental reports of ADHD symptoms and behavioural difficulties. This study observed strong correlations between the BRIEF and parental report of social communication traits and behavioural problems (see appendix 11 for correlations). Therefore it is possible that the elevated BRIEF scores are detecting broader difficulties or parental reporting biases as opposed to specific executive functioning problems.

This study employed an opt-in recruitment strategy as it was the most viable way to gain access to this non-clinical population. However, this may have consequently led to a recruitment bias, for example parents concerned with their child's cognitive or social development may have been more interested in their child taking part in this study. In turn this could limit the generalisability of findings. Additionally aspects of the analysis may have been impacted by the limited number of participants. For example note-worthy but non-significant effect sizes were observed for the impact of reported history of abuse on parent ratings of social communication traits ($r=.40$) and emotional and behaviour difficulties ($r=.43$). This might reflect an underlying issue with the statistical power for the findings outside of the main hypotheses.

4.4 Future implications

The identification of executive functioning difficulties in this paper, as well as evidence relating to the impact of early adverse experiences on cognitive development, indicate a need for further research to clarify the nature of adopted children's executive functioning abilities. Larger comparison studies including post-institutionalised, looked after and non-adopted children would be useful to disentangle the influence of pre-placement experiences and in particular the impact of dose of maltreatment and quality of pre-adoptive care. Furthermore, prospective longitudinal studies identifying and assessing children from point of adoption might enable a more accurate picture of potential risk factors for executive functioning, emotional, behavioural or social communication difficulties. Longitudinal studies could also offer the opportunity to explore the developmental trajectory of these

areas over time, this study only explored whether linear associations existed and did not consider the possibility of non-linear trajectories.

Of importance this study highlights that a sample of ‘non-clinical’ adopted children showed elevated difficulties across a range of areas. If these findings are validated in larger, representative samples then it would suggest that this is a population that might benefit from the development of specific clinical services offering early proactive support to address the aforementioned difficulties using evidence based interventions.

4.5 Conclusions

Overall, this study identified that a sample of children adopted from UK foster care showed poorer performance compared to normative data on both parental report and laboratory executive functioning assessment measures. These findings were specific, in so far as they were observed in the context of preserved overall cognitive ability and a measure of visual memory. These results are largely in line with the current (limited) literature base. The identified differences in performance between measures of executive functioning alongside the deficits observed across them, is in line with models of executive functioning which suggest it to be a broad construct. Furthermore, the lack of identified cognitive and memory difficulties support that executive functioning is distinct from general cognitive abilities. Controlling for ADHD the BRIEF scores demonstrated a strong negative correlation with age of adoption. This finding is contrary to a number of studies of post-institutionalised children where later age of adoption has been shown to negatively impact development. In line with this the SCQ scores demonstrated a strong positive correlation with age adopted. In addition elevated emotional and behavioural difficulties were identified. No other strong associations between the measured pre-adoption variables and outcomes at age 7-11 years were identified.

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6. Appendices

6.1 Appendix 1 – the research advert circulated via email and published in the Adoption UK magazine



Study assessing the intellectual functioning of children adopted from within the UK.

REC Reference Number: PNM/13/14-117

This project hopes to understand more about the executive functioning abilities of adopted children. Executive functioning is key processes involved in a child's academic development. Studies show that children who are adopted, and who have experienced maltreatment, are more likely to show executive functioning difficulties. This can manifest as difficulties with planning and organisation (e.g. following instructions). Understanding the intellectual profile of adopted children can enable services to tailor recommendations and support for adoptive families.

What does this study involve?

- Parents will complete 3 questionnaires about your child looking at; mental health, executive functioning and social communication traits. In addition we would like to collect some demographic information.
- Your child will completing a face to face assessment measuring their intellectual and executive functioning abilities. This assessment will occur in an NHS children's outpatient centre in south east London and will last approximately 2 hours.

What does my family get out of this study?

Following the assessment you will receive a letter summarising the results of your child's intellectual and executive functioning assessment.

Who can take part?

We are looking for children aged 7-11 who were adopted from the UK. We are not including children who have a diagnosis of Autistic Spectrum Disorder or an identified learning disability.

For further information please contact : alexandra.a.wretham@kcl.ac.uk

6.2 Appendix 2 – Demographic questionnaire.

| CHILD DEMOGRAPHIC DETAILS | |
|--|---|
| Age (in years and months) | ..... ..... |
| Gender | Male <input type="checkbox"/> Female <input type="checkbox"/> |
| Ethnicity | ..... |
| PARENT DEMOGRAPHIC DETAILS | |
| No. of parents | ..... |
| Parent age | ..... |
| Parent gender | ..... |
| Ethnicity | ..... |
| CHILD HISTORY | |
| Birth family mental health issues (parents or siblings) | ..... ..... ..... |
| Birth / pregnancy complications (please tick all that apply) | <input type="checkbox"/> Alcohol/ drugs exposure <input type="checkbox"/> Special care baby unit <input type="checkbox"/> Other Please describe |
| Age when left birth family (in years and months) | ..... |
| Age when placed for adoption (in years and months) | ..... |
| Age when adoption order granted (in years and months) | ..... |
| Time in foster care | ..... |
| Number of moves | ..... |

| | |
|---|---|
| <p>Siblings</p> <p>In current home [related /unrelated]</p> <p>Other related siblings</p> <p>Maltreatment or Neglect (please tick all that apply)</p> | <p>.....</p> <p>.....</p> <p>Physical abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Emotional abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Sexual abuse Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Neglect Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/></p> |
| <p>Age when child arrived at your family (in years and months)</p> | <p>.....</p> |
| <p>What services have you used? (please tick all that apply)</p> | <p><input type="checkbox"/> General CAMHS</p> <p><input type="checkbox"/> Specialist NHS adoption (or looked after child service)</p> <p><input type="checkbox"/> Local Authority post adoption service</p> <p><input type="checkbox"/> Peer to peer, e.g. support groups</p> <p><input type="checkbox"/> Independent: free or charging</p> |
| <p>Any identified mental health issues?</p> | <p>.....</p> <p>.....</p> <p>.....</p> |
| <p>Does your child get any educational support?</p> <p>Does your child attend a mainstream or specialist school?</p> <p>Statement of educational need</p> | <p>.....</p> <p><input type="checkbox"/> Mainstream School</p> <p><input type="checkbox"/> Specialist School</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> |

6.3 Appendix 3 – Ethics approval letter

Alexandra Wretham
Addiction Sciences Building
4 Winsdor Walk
London SE5 8AF

15 May 2014

Dear Alexandra,

PNM/13/14-117 Executive functioning ability and social communication traits measured in children adopted from the UK

Review Outcome: Full Approval

Thank you for sending in the amendments/clarifications requested to the above project. I am pleased to inform you that these meet the requirements of the PNM RESC and therefore that full approval is now granted.

Your approval is based on the following provisos being met:

1. Section 1.3: It is assumed that Dr Patrick Smith has a substantive contract of employment with the College.
2. Section 6.3: Please ensure that your approach to excluding ineligible participants is sufficiently sensitive.

You are not required to provide evidence to the Committee that these provisos have been met, but your ethical approval is only valid if these changes are made. You must not commence your research until these provisos have been met.

Please ensure that you follow all relevant guidance as laid out in the King's College London Guidelines on Good Practice in Academic Research (<http://www.kcl.ac.uk/college/policyzone/index.php?id=247>).

For your information ethical approval is granted until 15 May 2017. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not be sent a reminder when it is due to lapse.

Ethical approval is required to cover the duration of the research study, up to the conclusion of the research. The conclusion of the research is defined as the final date or event detailed in the study description section of your approved application form (usually the end of data collection when all work with human participants will have been completed), not the completion of data analysis or publication of the results.

For projects that only involve the further analysis of pre-existing data, approval must cover any

period during which the researcher will be accessing or evaluating individual sensitive and/or un-anonymised records.

Note that after the point at which ethical approval for your study is no longer required due to the study being complete (as per the above definitions), you will still need to ensure all research data/records management and storage procedures agreed to as part of your application are adhered to and carried out accordingly.

If you do not start the project within three months of this letter please contact the Research Ethics Office.

Should you wish to make a modification to the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications:

<http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx>

Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance

(<http://www.kcl.ac.uk/innovation/research/support/ethics/contact.aspx>)

We wish you every success with this work.

Yours sincerely,

James Patterson – Senior Research Ethics Officer

Cc: Patrick Smith

6.4 Appendix 4 – Ethics amendments approval letter

Alexandra Wretham
Addiction Sciences Building
4 Windsor Walk
London SE5 8AF

13 August 2014

Dear Alexandra,

PNM/13/14-117 Executive functioning ability and social communication traits measured in children adopted from the UK

Thank you for submitting a modification request form for the above study. I am writing to confirm approval of this. The modification is summarised broadly below:

1. Section 1.4: Addition of Consortium of Voluntary Adoption Agencies and British Association of Adoption and Fostering as gatekeeper organisations.

If you have any questions regarding this application please contact the Research Ethics Office.

Yours sincerely,

James Patterson - Senior Research Ethics Officer

Cc: Patrick Smith

PARTICIPANT INFORMATION SHEET

REC Reference Number: **PNM/13/14-117**

Executive functioning and social communication traits in children adopted within the UK

We would like to invite you to participate in this doctoral research project. You should only participate if you want to; choosing not to take part will not disadvantage you or your child in any way. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of this study?

This study is funded by Kings College London. It hopes to try and understand more about the executive functioning abilities and social communication skills of children adopted from within the UK. Executive functioning and social communication are key processes involved in a child's academic and social development. The term executive functioning encompasses a number of important mental processes involved in: problem solving, memory and planning. We hope that understanding more about these processes may help services to tailor their provisions for this population to ensure that adopted children and families receive the most appropriate support.

Why have I been chosen?

This study is recruiting children aged 7-11 years who were adopted from the UK and do not have a diagnosis of Autistic Spectrum Disorder or an identified learning disability. You have been chosen as a potential family following responding to an advertisement sent out by Adoption UK.

What does this study entail?

The executive functioning ability and social communication traits will be measured through parental report and cognitive assessments. Parents will be asked to complete 3 questionnaires about your child; one looking at mental health, one assessing executive functioning and one assessing social

communication traits. In addition we would like to collect some demographic information e.g. ethnicity and age of adoption to enable us to consider important factors which may affect performance on the cognitive assessments. The second stage of the study would involve your child completing a face to face assessment measuring their intellectual and executive functioning abilities. This assessment will occur in an NHS children's outpatient centre in south east London and it will last approximately 2 hours.

What are the benefits of the study?

Following completion of the assessment you will be sent a brief letter outlining the results of your child's intellectual and executive functioning assessments. This can help you better understand how your child learns and in turn help you support your child's academic development. As a thank you for taking part in the study we will also give your child a £10 gift voucher.

Are there any risks if I take part?

There are no known risks involved in the study and most children report enjoying the assessments. If you have any concerns about the study then you are welcome to contact the main researcher, Alexandra Wretham (Clinical Psychologist in Training) to discuss them.

Do I have to take part?

No, taking part is voluntary. Your decision whether or not to take part will not affect any ongoing healthcare, including future or current treatment. If you decide to take part you are free to withdraw at any time without giving a reason. You may also withdraw any data or information you have already provided up until it is analysed for use in the final report (before 31st March 2015). If you are interested in taking part then we will contact you by phone to discuss this study further.

Will my taking part in this study be kept confidential?

All information which is collected from the study will be kept strictly confidential. To ensure confidentiality we will allocate each family a study ID. Questionnaires and assessment results will be stored in locked filing cabinets that will only be accessible to the research staff involved in this study. Your results will also be entered into a computer file for statistical analysis, but your name will not be included and the files will be password protected.

The requirements of the 1998 Data Protection Act will be complied with at all times, and the research has been approved by the Psychiatry, Nursing and Midwifery (PNM) Research Ethics Subcommittee (RESC) at King's College London (ref **PNM/13/14-117**).

The only time that we might have to break confidentiality would be if we thought that you or someone else might be at risk of harm, or if we became aware of issues of a criminal nature. If we thought either yourself or someone was at risk of harm, we would try to talk to you about the issue prior to breaking confidentiality.

What will happen to the results of this study?

This study should be completed by June 2015. The results will be written-up as part of Alexandra Wretham's Doctoral Thesis in Clinical Psychology, and if possible, will also be published. None of the individual questionnaires or experimental results will be displayed in the results so you will not be identifiable in the report.

Who can I contact for further information?

If you have any questions or require more information about this study, please contact the researcher using the following contact details:

Researcher: Alexandra Wretham

Email address: alexandra.a.wretham@kcl.ac.uk

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below for further advice and information: The Chair, Psychiatry, Nursing and Midwifery Research Ethics Subcommittee, rec@kcl.ac.uk

Thank you for taking the time to consider this research study!

Study information!

We would like you to take part in a study! This sheet will tell you a bit about the study and how you could be involved. Please read it carefully and discuss it with your parents if you have any questions. You can also contact us if anything is unclear or if you want more information.

What is the study?

This study is looking at two skills which are involved in doing well at school and developing friendships. We want to learn more about these skills so that we can help children who struggle in these areas.

Why have I been chosen?

We are sending you this sheet as your parents responded to our advert. We are looking for children aged 7-11 years to take part in this study.

What do I have to do?

We will invite you to come and complete an assessment with us. This will involve you answering some questions and completing some puzzles. Some of these will be on a computer and most children find them fun. We will also ask your parents to fill out some questionnaires to send to us. After this we will send your parents a letter saying how you did, this will help them understand the things that you do really well in and things you find a bit more difficult. As a thank you for taking part in the study we will also send you a £10 gift voucher.

Do I have to take part?

No, it is up to you and your parents to decide whether you want to be part of this study. If you decide to take part and then change your mind, that is okay, you are allowed to leave the study at any time and you don't have to give us a reason.

Will people know that I am in this study?

No, all information will be confidential. This means that we won't tell people you are in this study. It also means that we won't show this information to

anyone and we will remove your name from questionnaires so that people won't be able to work out who they belong to. All your information will be stored in a safe, locked, place that only people involved in this study will be able to access. The only time that we might have to tell someone that you are involved in the study is if we are worried that you or someone else might be at risk of harm.

What will happen to my results?

Your results will be analysed on the computer with everyone else's. These results will then be written up as a bigger report which might be published in a scientific journal. The information about you will not be displayed in this report.

Who can I contact for further information?

If you have any questions then please speak to your parents. If they can't answer these then they can contact us to get more information.

Thank you!

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.



Title of Study: *Executive functioning and social communication traits in children adopted within the UK*

King's College Research Ethics Committee Ref: PNM/13/14-117

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

- I understand that if I, or my child, decide at any time during the research that we no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my child's data up to 31st March 2015.
- I consent to the processing of my child's personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998.

Participant's Statement:

I _____ (*insert name*) agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed

Date

Investigator's Statement:

I, Alexandra Wretham, confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the participant.

Signed

Date

6.8 Appendix 8 – Child consent form

King's College Research Ethics Committee Ref: PNM/13/14-117

PARTICIPANT CONSENT FORM

If you want to take part in this study, please complete this form with your parent's help and return it in the stamped addressed envelope provided.

Please tick the boxes below

I have read the Study Information sheet and I have been able to ask any questions that I have about the study.

I know it is up to me and my parents to decide whether I want to be part of this study. I know that if I take part in this study, it is okay for me to change my mind and leave the study at any time, without giving a reason.

I understand that the only time that the researchers might have to tell someone that I am involved in the study is if they are worried that I or someone else might be at risk of harm.

I agree to take part in this study.

Your name

Date

Signature

Researchers name

Date

Signature

1 for participant; 1 for researcher



2nd January 2015

REC Reference Number: PNM/13/14-117

Research summary

Dear Mrs X,

Thank you for attending the research assessment on the 1st January 2015 with your son xxx. This letter will briefly summarise xxx's performance on the intellectual and cognitive functioning assessments. In addition it will report the results from the mental health screening questionnaire which you completed prior to the assessment. Please note that this is not a clinical assessment report.

Mental health screening questionnaire

The Development and Well-Being Assessment (DAWBA, Goodman et al, 2000) is used to screen for psychiatric symptoms and associated functional impairment in children aged 5-17 years. The table below displays your parental ratings on the DAWBA. Responses marked with a '++' or '+++' reflect that you may have some concerns about your child's functioning in these areas. You might wish to discuss areas rated as '++' or '+++' with your GP to see if a formal assessment with a child and adolescent mental health service (CAMHS) would be helpful.

| | Parental report of symptoms | Parental report of impact on functioning |
|-----------------------------------|-----------------------------|--|
| Autistic Spectrum Disorder | - | - |
| Separation Anxiety | - | - |
| Specific Phobia | + | - |
| Social Phobia | - | - |

| | | |
|---------------------------------------|----|----|
| Panic Disorder | - | - |
| Agoraphobia | - | - |
| Post Traumatic Stress Disorder | - | - |
| Obsessive Compulsive Disorder | - | - |
| Generalised Anxiety | - | - |
| Depression | + | - |
| Deliberate Self Harm | ++ | - |
| Hyperactivity | + | ++ |
| Oppositional behaviour | + | - |
| Conduct disorder | + | - |
| Eating disorders | - | - |
| Tics | - | - |
| Other concerns | - | - |

Intellectual performance

The second version of the Wechsler Abbreviated Scale of Intelligence (WASI-II; Wechsler, 2011) was administered to gain a general overview of xxx's intellectual functioning. The WASI-II is a short battery of tests which measures various facets of intelligence and yields 3 intellectual functioning indices;

- 1) The VCI looks at stored verbal information.
- 2) The PRI measures nonverbal fluid abilities and coordination skills.
- 3) The FSIQ is an estimate of general intellectual ability.

The table below displays xxx's performance in relation to other children of the same age. IQ scores on the WASI-II have a mean of 100 and a standard deviation of 15. The percentile scores reflect the percentage of scores in the normative data that are the same or lower than your child's score. For example, a score at the 60th percentile means that the child's score is the same as or higher than the scores of 60% of children of the same age in the standardised population.

| | IQ score | Percentile | Ability Level |
|---|-----------------|-------------------|----------------------|
| Verbal Comprehension Index (VCI) | 95 | 37 th | Average |
| Perceptual Reasoning Index (PRI) | 95 | 37 th | Average |
| Full Scale IQ (FSIQ) | 95 | 37 th | Average |

Overall xxx scored in the average range.

Executive functioning

xxx completed a number of sub-tests from the Cambridge Neuropsychological Test Automated Battery (CANTAB). These tasks assess aspects of your child's memory, attention and executive functioning.

- 1) Spatial Working Memory looks at the ability to remember and then use visual information.
- 2) Paired Associate Learning assesses visual memory and how easy it is to learn new things.
- 3) Stocking of Cambridge is a test of practical planning and problem solving.
- 4) Intra-Extra Dimensional Set Shift requires an individual to correctly identify patterns to guide their answers and then identify when the pattern changes so they can respond to this by shifting their responses accordingly.

| Domain | Sub-test | Description of Performance |
|-----------------------|-----------------------------------|--|
| Visual Memory | Spatial Working Memory | <i>Low Average - Borderline</i> |
| | Paired associate learning | <i>Average</i> |
| Executive functioning | Stockings of Cambridge | <i>Average</i> |
| | Intra-Extra Dimensional Set Shift | <i>Low Average</i> |

Recommendations and resources

- If you are concerned about your child's mental or physical health then we advise you to contact your GP or local Child and Adolescent Mental Health Service to discuss this further.
- If you are concerned about your child's cognitive development then please contact your GP to discuss this further.
- If your child is experiencing academic difficulties at school you may wish to consult your child's school or an educational psychologist.
- You can find more information about the national adoption and fostering services at <http://www.national.slam.nhs.uk/services/camhs/camhs-adoptionfostering/>

Below are some practical recommendations which can be helpful to support children with executive functioning difficulties.

1. Tasks can be broken down into smaller chunks of information to help support a child's working memory. So for example if a child struggles to complete multi-step commands you could try reducing the number of steps in the command.
2. For individuals who demonstrate difficulties keeping track of more than one or two steps at a time, providing a written checklist of steps required to complete a task can serve as an external memory support.
3. For children who are easily distracted it can be useful to try and find a quiet area away from distractions when you ask a command. Similarly in school it can be helpful for the child to sit away from distractions (e.g. near the teacher) to support their attention.
4. It can be helpful to check that your child has heard and understood what is required (e.g. by asking them to repeat it back).
5. Short 'brain breaks' can be useful for children who struggle to maintain focus on a task. Examples of quick 'brain breaks' include: running a short errand, getting a drink or bringing work to show the teacher or parent.

Thank you for taking part in this study, we hope that you have found this research report useful. If you have any questions about this study, please contact the lead researcher via the email address alexandra.a.wretham@kcl.ac.uk.

If this study has harmed you in any way or if you wish to make a complaint about the conduct of the study you can contact King's College London using the details below for further advice and information: The Chair, Psychiatry, Nursing and Midwifery Research Ethics Subcommittee, rec@kcl.ac.uk

Yours sincerely,

Alexandra Wretham

Lead researcher, Trainee Clinical Psychologist

Supervised by Dr Matt Woolgar

Consultant Clinical Psychologist and Senior Researcher

6.10 Appendix 10 – skew and kurtosis scores for the SCQ, BRIEF and CANTAB

| | | CANTAB IED errors adjusted | CANTAB PAL total errors | CANTAB SOC problems solved | CANTAB SWM total errors | SCQ score | BRIEF_GEC |
|---------------------------|---------|----------------------------------|-------------------------------|-------------------------------------|-------------------------------|--------------|-----------|
| N | Valid | 30 | 27 | 26 | 30 | 30 | 30 |
| | Missing | 0 | 3 | 4 | 0 | 0 | 0 |
| Mean | | -.4470 | .0522 | -.2912 | -.7947 | 4.7000 | 65.3333 |
| Std. Deviation | | .83680 | .76592 | .93506 | 1.02243 | 3.73382 | 13.11312 |
| Variance | | .700 | .587 | .874 | 1.045 | 13.941 | 171.954 |
| Skewness | | 1.556 | -2.097 | -.323 | -.644 | .568 | -.436 |
| Std. Error of Skewness | | .427 | .448 | .456 | .427 | .427 | .427 |
| Kurtosis | | 2.159 | 6.749 | .324 | .726 | -.976 | -.484 |
| Std. Error of Kurtosis | | .833 | .872 | .887 | .833 | .833 | .833 |
| Range | | 3.35 | 3.80 | 4.09 | 4.54 | 12.00 | 52.00 |
| Minimum | | -1.57 | -2.82 | -2.51 | -3.30 | .00 | 37.00 |
| Maximum | | 1.78 | .98 | 1.58 | 1.24 | 12.00 | 89.00 |

6.11 Appendix 11 - Displays the Pearson's r correlation value for reported demographic variables and measures.

| | BRIEF GEC | CAN TAB IED | CAN TAB SOC | CAN TAB SWM | SDQ total | WASI -II FSIQ | SCQ total | Age | Age left birth family | Age Adopt ed | Time since adopt ion |
|--------------------------------|--------------|-------------------|-------------------|-------------------|--------------|---------------------|--------------|--------|--------------------------------|--------------------|-------------------------------|
| BRIEF GEC | 1 | .011 | .063 | -.158 | .661** | -.192 | .610** | -.035 | .138 | .176 | -.050 |
| CAN TAB IED | .011 | 1 | 0.242 | 0.142 | -.139 | -.040 | .013 | -.401* | -.189 | -.112 | -.219 |
| CAN TAB SOC | .063 | 0.242 | 1 | .438* | -.005 | .293 | .173 | -.137 | .199 | .134 | -.254 |
| CAN TAB SWM | -.158 | 0.142 | .438* | 1 | -.044 | .294 | .024 | .104 | .189 | .253 | -.227 |
| SDQ total | .661** | -.139 | -.005 | -.044 | 1 | -.155 | .408* | .180 | .183 | .183 | .065 |
| WASI -II FSIQ | -.192 | -.040 | .293 | .294 | -.155 | 1 | -.070 | .163 | .142 | .179 | -.158 |
| SCQ total | .610** | .013 | .173 | .024 | .408* | -.070 | 1 | .036 | .221 | .396* | -.188 |
| Age | -.035 | -.401* | -.137 | .104 | .180 | .163 | .036 | 1 | .037 | .083 | .459* |
| Age left birth family | .138 | -.189 | .199 | .189 | .183 | .142 | .221 | .037 | 1 | .882** | .713** |
| Age Adopt ed | .176 | -.112 | .134 | .253 | .183 | .179 | .396* | .083 | .882** | 1 | .773** |
| Time since adopt ion | -.050 | -.219 | -.254 | -.227 | .065 | -.158 | -.188 | .459* | .713** | .773** | 1 |

* $p < .05$

** $p < .001$

Service Evaluation Project

EVALUATION OF A LONG TERM
HEALTH CONDITIONS GROUP FOR
INDIVIDUALS WITH ANXIETY AND
DEPRESSION

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Abstract

Individuals with long-term medical health conditions (LTC) are at increased risk for experiencing co-occurring mental health difficulties. This dual-diagnosis of mental and physical health conditions is associated with poorer overall physical health, more reported impairments in daily functioning and reduced ratings of quality of life. Furthermore it has a wider societal impact in terms of increased service usage and cost of care. As a result developing effective interventions for these individuals is a priority.

This service evaluation project examines a step 2 group based intervention for individuals with LTC and anxiety and depression, the Wellbeing group. The outcomes of 20 group completers were included in the analysis. The effectiveness of the Wellbeing group was analysed through evaluating clinical measures used to assess: psychological wellbeing (PHQ-9, GAD-7), social functioning (WSAS) and quality of life (EuroQoL). In addition service user feedback was examined to aid development of the group and determine the acceptability of the group.

The analysis identified that the Wellbeing group was an effective intervention for decreasing self-report levels of depression, anxiety and work and social functioning. This was demonstrated by statistically significant reductions in reported difficulties, medium effect sizes were observed for all measures. Statistically significant changes were not identified on the EuroQol however there was an observed increase in subjective health state as measured by the EuroQol VAS. In addition the service user feedback and low attrition rates support the idea that this may be an acceptable intervention.

These findings are in line with previous research looking at psychological interventions for individuals with LTC and co-morbid anxiety and/or depression. In summary the Wellbeing group appears to be a useful low intensity intervention for service users with LTCs and mild to moderate anxiety and/or depression. Scope for further improvement in the research and validation of the Wellbeing group is discussed.

1. Introduction

1.1 Overview

In 2011 the British Government introduced the ‘No health without mental health’ strategy (Department of Health, 2011, see section 1.3 for more information). One of the key objectives of this strategy was to improve the mental health of individuals with long term (also known as chronic) physical health conditions (henceforth referred to as LTC).

This project will be evaluating the effectiveness of a psychological group intervention implemented by Southwark Improving Access to Psychological Therapies (IAPT) service. This was developed in response to the ‘No health without mental health’ strategy. This project will examine the outcomes of three pilot groups and one subsequent treatment group with the following aims:

- 1) To assess the effectiveness of the group treatment for individuals with LTC and co-morbid depression
- 2) To examine the acceptability of the intervention through service user feedback
- 3) To incorporate service user feedback to continue to aid development of the group

1.2 Government strategy regarding physical and mental health

In 2011 the British Government introduced the ‘No health without mental health’ strategy. This strategy set out six key objectives:

1. More people will have good mental health
2. More people with mental health problems will recover
3. More people with mental health problems will have good physical health
4. More people will have a positive experience of care and support
5. Fewer people will suffer avoidable harm
6. Fewer people will experience stigma and discrimination

The government's third objective that 'more people with mental health problems will have good physical health' focuses on the bi-directional relationship between mental and physical health. In this strategy they reported that individuals with LTCs are at an increased risk of developing mental health problems, furthermore the development of mental health problems is associated with long-term negative consequences. Within this particular objective the government aimed to decrease the mortality rates for individuals with mental health conditions and to improve the mental health of individuals with poor physical health. As part of this, IAPT were chosen to lead to extension of talking therapies to individuals with LTC and medically unexplained symptoms (MUS).

1.3 Improving Access to Psychological Therapies (IAPT)

IAPT is an NHS programme that began being rolled out nationally in 2008. It was designed to treat individuals with depression and anxiety disorders using only interventions approved by the National Institute of Health and Clinical Excellence (NICE). The second phase of the programme commenced following the publications of 'Talking Therapies: a four year plan of action' and 'No health without mental health' in 2011. This aimed to expand the IAPT programme to children and young people, and people with LTC, MUS or severe mental illness. (DoH, 2012). This project is focusing on one specific IAPT service based within London. Southwark IAPT is a primary mental health service that was initially launched in 2008. In February 2012 Southwark IAPT was awarded joint funding with Bexley Mind to become one of the 15 IAPT LTC/MUS Pathfinder sites.

1.4 Pathfinders project

Following the second phase of IAPT roll out, IAPT and non-IAPT psychological providers were invited to apply to become an IAPT LTC/MUS Pathfinder site in December 2011. 15 sites were chosen in February 2012 and the project began to be rolled out on the 1st April 2012 (de Lusignan et al., 2013). The aims of the LTC/MUS pathfinder project were to determine: the optimal stepped care treatment pathway for LTC/MUS patients, the needed therapy components and the required staff training. This pathfinder project also plans to evaluate the cost effectiveness and

efficiency of treatment models. In addition, it will consider the effectiveness of psychological interventions for LTC/MUS patients.

1.5 LTC definition

The DoH website defines LTC as “*a health problem that can’t be cured but can be controlled by medication or other therapies*” These include (but are not limited to): cardiovascular conditions, diabetes, chronic obstructive pulmonary diseases, arthritis and so on. In addition conditions such as cancer and HIV are increasingly being conceptualised within this definition due to the prolonged life expectancy associated with medical advancements. The term LTC could also encompass certain enduring mental health conditions (e.g. depression and psychosis). However this project will use the term LTC to refer solely to physical health conditions, to reflect the intervention being examined.

1.6 LTC prevalence

According to the DoH (2013) over 15 million individuals in England have a LTC (approximately one quarter of the population). This figure is estimated to rise with the increase in life expectancy and associated increase in the development of conditions such as dementia.

1.7 Mental health

The World Health Organisation (WHO) defines mental health as being a state of wellbeing in which an individual realizes his/her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his/her community (WHO website, 2013). The DSM-IV-TR describes a mental disorder as

“a clinically significant behavioural or psychological syndrome or pattern that occurs in an individual and that is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more areas of functioning) or with significantly increased risk of suffering death, pain, disability, or an important loss of freedom. In addition this syndrome or

pattern must not be merely an expectable and culturally sanctioned response to a particular event, for example the death of a loved on”.

This study will predominantly focus on individuals presenting with depression, and therefore will not go into depth describing other mental health conditions.

1.8 Depression definition

Depression is broad diagnosis that covers a number of heterogeneous presentations of varying severity and longevity. The 10th edition of the International Classification of Diseases (ICD-10) describes the key symptoms of depression as persistent sadness or low mood and/or loss of interests or pleasure, fatigue or low energy. To reach a diagnosis of depression the ICD-10 stipulates that one or more of these symptoms must be present for the majority of the time over the previous 2 weeks. Other commonly reported symptoms of depression included in the ICD-10 are:

1. Reduced concentration and attention
2. Reduced self-esteem and self-confidence
3. Ideas of guilt and unworthiness
4. Bleak and pessimistic views of the future
5. Ideas or acts of self-harm or suicide
6. Disturbed sleep
7. Diminished appetite

The ICD-10 categorises first depressive episodes into 3 broad categories: mild, moderate and severe. Further subdivisions exist for individuals with recurrent depressive disorder. It has also been recognised that individuals presenting with persistent sub-threshold depressive symptoms may also experience distress and have a marked impact on their functioning, as a result NICE guidance includes 'subthreshold depressive symptoms' (See section 1.17).

1.9 Depression prevalence

Depression is one of the most common adult mental health disorders. Moffitt et al (2010) found lifetime prevalence rates varied between 16.9 and 41.4% depending on whether the study was prospective or retrospective. In older community populations the prevalence of depression has been estimated to be between 10 and 15% (Lindesay et al., 1989; Livingston et al., 1990). Depression can have a severe impact on quality of life, physical health and it is the number one cause of disability worldwide (Murray and Lopez, 1997).

1.10 Prevalence of co-morbid mental health problems

It should be remembered that psychological diagnosis are highly co-morbid. Kessler et al (1994) estimated that 32-80% of individuals with one psychological disorder have at least one further co-morbid disorder. Of note, depression and anxiety disorders have been found to frequently co-occur. For example Beekman et al (2000) found that 48% of individuals aged 55 to 85 years with depressive disorders also met the criteria for an anxiety disorder, and 26% of individuals with an anxiety disorder met the criteria for a depressive disorder. Therefore although this study is focussing on individuals with depression it is likely that a number of the participants could also be experiencing symptoms of anxiety or meet the criteria for a co-morbid anxiety disorder.

1.11 Prevalence of co-morbid mental health conditions and LTC

Research has consistently shown that many individuals with LTC have co-occurring mental health difficulties. This has been observed in a range of LTC e.g. Chronic Obstructive Pulmonary Disorders, COPD (Kunik et al., 2005; Yohannes, 2000; Livermore et al., 2010), migraines (Juang et al., 2000), diabetes (Finkelstein et al., 2003; Grigsby et al., 2002) and arthritis (Theis et al., 2007). Overall research estimates that individuals with LTC are two to three times more likely to experience mental health problems compared to the general population (Naylor et al., 2012). This effect has been observed in a range of countries. Moussavi et al (2007) studied 245,404 individuals from 60 countries from all regions of the world and found

statistically significantly higher prevalence rates of depression in individuals with a LTC (angina, arthritis, asthma and diabetes) than those without a LTC. They found that on average between 9.3% and 23% of participants with one or more LTC had co-morbid depression.

Although much of the evidence base has looked specifically at depression there is also evidence that some LTC are associated with an increased prevalence of other conditions such as anxiety disorders (Goodwin et al., 2009) and dementia (Xu et al., 2009; Ohara et al., 2011). However this project will focus primarily on depression.

1.12 Impact of co-morbid mental health conditions on physical health

The dual diagnosis of LTC and depression is associated with poorer overall physical health (Mathers et al., 2001; Moussavi et al., 2007). Moussavi et al (2007) demonstrated that co-morbid depression and LTC lead to significantly lower mean health scores than either depression or one or more LTCs alone. This effect was particularly prominent for diabetes where the mean health scores fell from 78.9 to 58.5 when looking at individuals with co-morbid depression. This effect remained when adjusting for socio-demographic factors, country and economic factors.

The addition of depression alongside a LTC has also been demonstrated to increase clinical symptomology. For example Whooley et al (2008) found that after adjusting for co-morbid conditions and cardiac disease severity, participants with baseline depression and coronary heart disease showed 31% more cardiovascular events (heart failure, myocardial infarction, stroke, transient ischemic attack or death) than those without depression. In line with this, the addition of mental health problems has shown increased risk of mortality compared to individuals with LTC alone (Blumenthal et al., 2003; Junger et al., 2005). Furthermore De Jonge et al (2007) suggested that non-response to depression treatment following myocardial infarction might be associated with cardiac events.

1.13 Functional impact of co-morbid mental health conditions

In addition to the physical implications of co-morbid LTC and mental health conditions, there is evidence to suggest that this combination also has detrimental effects on an individual's daily functioning. Research has shown that individuals with LTC and co-morbid depression demonstrate poorer self care (Das-Munchi et al., 2007) and less compliance with treatment (e.g. DiMatteo et al., 2000; Theofilou, 2013; Vamos et al., 2009; Gehi et al., 2005). For many LTCs self care and treatment compliance are vital to minimise clinical symptomology, therefore problems in these areas could be influencing the increase in reported physical problems. Similarly co-morbid depression and LTCs have been associated with decreased physical activity (e.g. Ruo et al., 2004). Whooley et al (2008) found that after adjusting for co-morbid physical conditions and cardiac disease severity, depressive symptoms were associated with a 31% increased rate of cardiovascular events. However, this association did not remain after adjusting for physical inactivity and other health behaviours. Therefore it may be that the behavioural consequences of low mood (i.e. physical inactivity and poorer self care) affect clinical symptoms.

1.14 Impact of co-morbid mental health conditions on an individuals' quality of life

Alonso and colleagues (2004) looked at the impact of LTC on health related quality of life (QoL) using a large sample across 8 countries. They found that in all 8 countries individuals with LTC scored poorer on health related QoL measures than individuals without a LTC. Similarly a number of studies have demonstrated that depression is associated with poorer QoL ratings of (e.g. Rapoport et al., 2005; Wittchen et al., 2000). De Jong et al (2006) examined the effects of depressive symptoms on the QoL of individuals with cardiovascular diseases. They found depressive symptoms had a bigger impact on QoL than the severity of cardiac problems. Furthermore Lim et al (2012) demonstrated that the combination of depression and a LTC negatively affects an individual's QoL greater than either condition alone. Therefore there is evidence to suggest that individuals with LTC and co-morbid mental health conditions may be experiencing a substantially reduced QoL.

1.15 Wider costs of co-morbid mental health conditions and LTC

The impact of the combination of LTC and mental health problems has wider societal implications. For example this group of individuals have been shown to use clinical services more frequently (e.g. Teeson et al., 2009). A UK survey showed that individuals with diabetes and mental health problems utilised more GP consultations and experienced more hospital admissions than those with diabetes alone (Das-Munshi et al., 2007). Currently individuals with LTC account for 70% of the total health and care expenditure (over £70 billion per annum, DoH, 2013). The increased service use for individuals with LTC and depression has been reflected by a substantial increase in the cost of care compared to individuals with LTC alone (e.g. Hochlehnert et al., 2011; Hutter et al., 2010; Simon et al., 2005). Melek and Norris (2008) looked at USA data for national health cost claims. They found individuals with LTC and anxiety or depression spent approximately 33-169% more on medical expenditure per month (excluding the cost of mental health services). Similarly in 2012 Naylor and colleagues estimated that there was a 45-75% increase in cost of care after adjusting for severity of the physical condition. (See Naylor et al., 2012 for a more in depth financial review).

Finally the combination of mental health conditions and LTC has been shown to impact on employers. Compared to individuals with LTC alone this group show more absence from work and sick days, furthermore on top of the cost of statutory sick pay, companies are likely to be losing money due to the impact on productivity (Hutter et al., 2010; Druss et al., 2000).

1.16 Impact on carers

Chronic illness does not affect just the individuals with the LTC they also have a wider impact on family members who may find themselves becoming an informal carer for their relatives. It has been found that caring for a relative with a LTC or a mental health condition can have significant influences on carers psychological, physical and social wellbeing (Lim and Zebrack., 2004; Magliano et al., 2005). Furthermore being an informal carer is associated with substantial financial costs (e.g. McCrone et al., 2008).

1.17 Psychological treatments for depression

The NICE guidelines for depression advocate using a stepped care model of treatment as displayed in figure 1. The stepped care model aims to ensure that individuals receive the least restrictive treatment and that treatment is self-correcting. Individuals should therefore initially start at lower treatment steps, if these interventions are unsuccessful or declined then they can be moved up to more intensive interventions.

Figure 3 - The stepped-care model. From NICE clinical guideline 90, page 15-16.

| Focus of the intervention | Nature of the intervention |
|--|--|
| STEP 4: Severe and complex ^[a] depression; risk to life; severe self-neglect | Medication, high-intensity psychological interventions, electroconvulsive therapy, crisis service, combined treatments, multiprofessional and inpatient care |
| STEP 3: Persistent subthreshold depressive symptoms or mild to moderate depression with inadequate response to initial interventions; moderate and severe depression | Medication, high-intensity psychological interventions, combined treatments, collaborative care ^[b] and referral for further assessment and interventions |
| STEP 2: Persistent subthreshold depressive symptoms; mild to moderate depression | Low-intensity psychosocial interventions, psychological interventions, medication and referral for further assessment and interventions |
| STEP 1: All known and suspected presentations of depression | Assessment, support, psychoeducation, active monitoring and referral for further assessment and interventions |
| ^[a] Complex depression includes depression that shows an inadequate response to multiple treatments, is complicated by psychotic symptoms, and/or is associated with significant psychiatric comorbidity or psychosocial factors ^[b] Only for depression where the person also has a chronic physical health problem and associated functional impairment (see 'Depression in adults with a chronic physical health problem: treatment and management' [NICE clinical guideline 91]). | |

NICE advocate the use of the following psychological interventions for individuals with depression: CBT, interpersonal therapy (IPT), behavioural activation (BA) and behavioural couples therapy.

1.18 Evidence base for treating mental health conditions in LTC patients

Spurgeon et al (2005) examined the implications of a 8 week CBT based group intervention. They ran groups for patients who: frequently attended GP surgeries, had diabetes, had hypertension or had asthma. Compared to controls all groups showed a significant improvement in psychological wellbeing and a significant reduction in uptake of primary and secondary care services following the intervention. The effects were seen more predominantly for the frequent attendees and patients with hypertension (which has a more established psychological component), patients with diabetes only showed improvements on anxiety scores. However, more recently Lamers and colleagues (2010) evaluated the effectiveness of a nurse led minimal psychological intervention (MPI) in older adults (60 years and above) with individuals with depression and type II diabetes or COPD. They found that at a 9 month post intervention follow up patients receiving the MPI had significantly fewer depressive symptoms than the usual care control group. In addition the MPI diabetic patients rated themselves as having a better QoL than diabetic controls.

Looking at specific conditions there is some evidence that psychological interventions are useful for individuals with COPD and co-morbid mental health problems. Howard et al (2010) implemented a CBT based intervention for individuals with COPD and found significant reductions in anxiety and depression. Furthermore they identified and decreased: health care use, A&E attendance and admittance and pharmacy costs. Similarly Hynninen et al (2010) conducted a small RCT (n=51) comparing CBT versus enhanced standard care for COPD patients with “clinically significant” anxiety and depression. They observed a significant improvement in anxiety and depression scores for the CBT group, which was maintained at 8 months follow up. However, they did not find an associated improvement in sleep and health status.

A number of studies have examined the effectiveness of psychological interventions for individuals with co-morbid cardiac conditions. Berkman et al (2003) found greater improvements in psychosocial outcomes at 6 months in myocardial infarction (MI) patients treated with CBT supplemented with an SSRI anti-depressant compared to treatment as usual. However, a significant difference in physical health

outcomes at a later follow-up (mean 29 months) was not observed. A Cochrane review of psychological treatments for coronary heart disease (CHD) (Rees et al., 2004) concluded that psychological interventions showed no evidence of effect on total or cardiac mortality. However, it was noted that the poor quality of the studies and identified publication bias may weaken the reliability of these findings.

Looking at studies examining chronic pain, Chiesa and Serretti (2011) reviewed research looking at the effectiveness of mindfulness based interventions (MBIs). The preliminary results showed a reduction of pain symptoms and improvement of depressive symptoms in patients. However, most of the studies reviewed were limited in design (e.g. small sample sizes and lack of randomisation), suggesting a need for better quality investigations. Huggins et al (2012) studied individual with HIV and chronic pain who undertook a CBT intervention. They found increases in pain acceptance were associated with decreased levels of pain anxiety and decreases in pain related impairment following treatment. Migliorini et al (2011) used a multiple case study approach to determine the acceptability of a CBT and positive-psychology based online treatment for individuals with spinal cord injury and depression or depression and anxiety. They reported that all participants showed some positive improvements and found the program to be acceptable.

Overall there is currently emerging research suggesting that psychological interventions may have beneficial effects in reducing psychological symptoms for individuals with LTC and anxiety and/or depression. Whether they have additional benefits in terms of physical health and financial implications is still unclear. Well-powered high quality randomised studies and reviews are necessary to clarify the wider effects of psychological interventions and whether this is mediated by the physical health condition.

1.19 NICE guidance for treating co-morbid depression and LTC

The research base described here has increased awareness of the necessity to identify and intervene effectively with co-morbid psychological problems in individuals with LTCs. In line with this NICE produced guidance to treating co-morbid depression and physical health problems in 2009. Similar to the depression guidance a stepped

care approach was advocated. For mild to moderate depression or persistent sub-threshold symptomology the first intervention should be: structured group physical activity programmes, group based peer support, individual CBT based guided self help or computerised CBT (CCBT). The NICE guidelines suggest that peer support groups should be “*delivered to groups of patients with a shared chronic physical health problem*”. For individuals who do not find the above interventions helpful or who present with moderate depression they suggest considering the use of: an antidepressant, group based CBT, individual CBT or behavioural couples therapy. Individuals who present with severe depression and a chronic physical health problem should be considered for a combination of individual CBT and an antidepressant.

1.20 Development of the Wellbeing Group for People with Long-Term Health Conditions and Mild to Moderate Anxiety and Depression (Wellbeing group)

One of the LTC/MUS pathfinders developments in Southwark was the creation of a step 2 group intervention for individuals with LTC and anxiety and depression (the Wellbeing group). This group was created by Professor Andre Tylee (King’s College London) and Dr Sharon Chambers (North East Team Leader in Southwark IAPT). Initially the group was targeted for individuals with depression and a LTC, which is reflected in the course materials and topics, however during the pilot stage the inclusion criteria was expanded to include individuals with general anxiety. As the group is for individuals with varying LTC and depression and/or anxiety it attempts to work transdiagnostically. To develop the protocol the group leaders continually gathered and integrated service user feedback to enhance the effectiveness and acceptability of the group. At the time of this project four groups had been run in Southwark, three pilot groups and one treatment group.

1.21 Structure of the group

The Wellbeing group consists of seven 2 hourly sessions, one introduction session and six treatment sessions with an individual review in the final session. The treatment sessions involve a combination of: psychoeducation, CBT, relaxation

training, mindfulness strategies, peer support and behavioural activation. Over the six weeks five main topics are covered: importance of self care, adjusting activities, improving sleep, managing activities and the role of thinking patterns.

1.22 Group participants

Participants were invited to attend the Wellbeing group if they had a medically diagnosed LTC and presented with current sub-threshold to moderate symptoms of depression and/or anxiety. Patients presenting primarily with specific anxiety disorders or more severe mental illnesses were not invited to attend the group. Appendix 1 outlines the Wellbeing group inclusion and exclusion criteria.

1.23 Aims of the study

This study aims to assess the effectiveness of the Wellbeing group through the analysis of clinical measures used to assess: psychological wellbeing, social functioning and quality of life. In addition this study aims to examine the service user feedback to aid development of the group and determine the acceptability of the group.

2. Method

2.1 Procedure

Clinical governance approval was received from the South London and Maudsley Mood, Anxiety and Personality audit committee prior to commencing data extraction and analysis. Following this the relevant demographic and outcomes data for groups 3 and 4 were extracted from a Microsoft excel database. The information for groups 1 and 2 was gathered from IAPTus, a secure online psychotherapy patient management system. Additional data that was not on IAPTus was gathered from the original paper copies of the measures. All relevant data was entered onto an excel spreadsheet.

2.2 Data checking

Approximately 10% of the of data items on the excel database were checked against the IAPTus database to check for data entry errors.

2.3 Confidentiality

The data was stored on a password protected Microsoft excel spreadsheet. To ensure confidentiality the individuals were coded by their IAPTus reference numbers. The spreadsheet was only stored on a SLAM computer folder and on an encrypted iron key.

2.4 Participants

The participants were selected from the list of individuals who had attended the Wellbeing group. Only individuals who had attended at least half of the group sessions were included in the analysis, non-completers were not included in the analysis. 12 individuals were invited to attend the group but were not included in the analysis because they either failed to engage with the group or they did not complete one of the first four groups.

2.5 Measures

All measures were collected prior to this service evaluation project. The Patient Health Questionnaire 9 (PHQ-9), The Generalized Anxiety Disorder 7 (GAD-7) and Work and Social Adjustment Scale (WSAS) were collected weekly during the group. In addition the Euroqol was collected at 3 points, pre treatment, mid treatment and post treatment.

2.5.1 Patient Health Questionnaire 9 (PHQ-9)

The PHQ-9 (Kroenke et al., 2001) is a brief questionnaire which scores each of the nine DSM-IV areas of depression in terms of frequency ranging from “0” not at all to “3” nearly every day. Higher PHQ-9 scores are hypothesised to reflect more severe depressive episodes. Kroenke et al (2001) found that a PHQ-9 score ≥ 10 demonstrated 88% sensitivity and 88% specificity for major depression. Similarly Arroll et al (2010) found the sensitivity and specificity in a primary care population to be 74% and 91%, respectively. Furthermore research has suggested that the PHQ-9 scores are not confounded by medical condition (e.g. Kroenke et al., 2001; Ferrando et al., 2007; Lamers et al., 2008), supporting its use with this population. Kroenke et al postulated the following PHQ-9 cut off scores: 5 (mild depression), 10 (moderate depression), 15 (moderately severe depression) and 20 (severe depression). These cut-offs shall be used in this project.

2.5.2 Generalized Anxiety Disorder 7 (GAD-7)

The GAD-7 (Spitzer et al., 2006) is a brief questionnaire designed to screen for and access the severity of GAD. It consists of 7 items which are rated on a four point scale of frequency ranging from “0” not at all to “3” nearly every day. The cut off score of 10 was selected by Spitzer et al to identify “caseness”, with a sensitivity score of 89% and specificity score of 82%. An increase in score was found to be associated with multiple domains of functional impairment. The cut off scores of 5, 10 and 15 were suggested as potentially representing mild, moderate and severe levels of anxiety. These cut-offs shall be used in this project.

2.5.3 Work and Social Adjustment Scale (WSAS)

The WSAS (Marks, 1986) is a self-report measures looking at a patients' perception of functional impairment. It consists of a number of likert scales asking about the degree of functional impact on 5 areas: work, home management, social leisure activities, private leisure activities and family and relationships. Mundt et al (2002) found the measure to demonstrate internal scale consistency from 0.70 to 0.94 and a test-retest correlation of 0.73.

2.5.4 Euroqol

The EuroQol group created the EuroQol measure in 1990 to describe and evaluate health related quality of life. The measure enables individuals to describe their health related state on five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Dolan (1997) used the time trade-off method to create direct valuations for the 42 EuroQol health states. In this study the EuroQol data was transformed into the time trade-off scores (TTO) to enable pre and post analysis. In addition the EuroQol contains a subjective visual analogue scale (VAS). On the VAS individuals rate their current perceived health state from zero (worst imaginable health state) to 100 (best imaginable health state).

2.6 Service User feedback

Qualitative participant feedback was collected weekly for the groups. The during treatment feedback form asked what was helpful from the session, what the individuals would like more of and what could be improved (see appendix 2).

2.7 Statistical Analysis

The demographic data was analysed to give an overview of the demographic characteristics of participants in the Wellbeing group. This primarily consisted of calculating a measure of central tendency and dispersion, or frequency using SPSS Statistics 20. Paired sample t-tests were run using SPSS to look at the differences in pre and post treatment scores for all group completers. This was done for the PHQ-9, GAD-7, WSAS, EuroQol and EuroQol VAS. In addition a crosstabulation was

performed on SPSS to determine the number of individuals meeting the threshold for caseness (≥ 10) for the PHQ-9 and GAD-7.

3. Results

3.1 Demographics of group attendees

30 individuals were invited to attend the Wellbeing group, of these 30, 10 individuals (33%) failed to engage and did not attend the group. Of the 20 individuals who attended the Wellbeing group 18 (90%) completed the group. Of these attendees just over half (55%, $n = 11$) were female. The age of attendees ranged from 22 to 79 years with the mean age of attendees being 55.9 years ($S.D. = 11.92$). The majority (60%, $n = 12$) were referred from their GP. Four individuals self referred to IAPT (20%) and the remaining four (20%) were referred from other services.

Group attendees were referred with a range of presenting physical conditions including: cardiovascular problems, musculoskeletal conditions, breathing problems, diabetes, chronic pain and medically unexplained symptoms. See appendix 3 for a outline of presenting physical conditions. The majority of individuals were referred with one primary physical condition (50%, $n = 10$), a quarter reported 2 conditions (25%, $n = 5$), three individuals reported 3 conditions (15%) and two reported 4 or more conditions (10%).

The mean number of sessions attended was 5.9 ($S.D. = 1.37$, range 4 to 8). Following the group nine individuals (45%) were discharged from IAPT. Of the remaining eleven: six (30%) were stepped up to high intensity individual CBT, three (15%) went to other low intensity groups (Mindfulness Based Cognitive Therapy, Behavioural Activation and Compassion and Relaxation training), one was stepped up to high intensity counselling and the final individual went to low intensity individual Behavioural Activation.

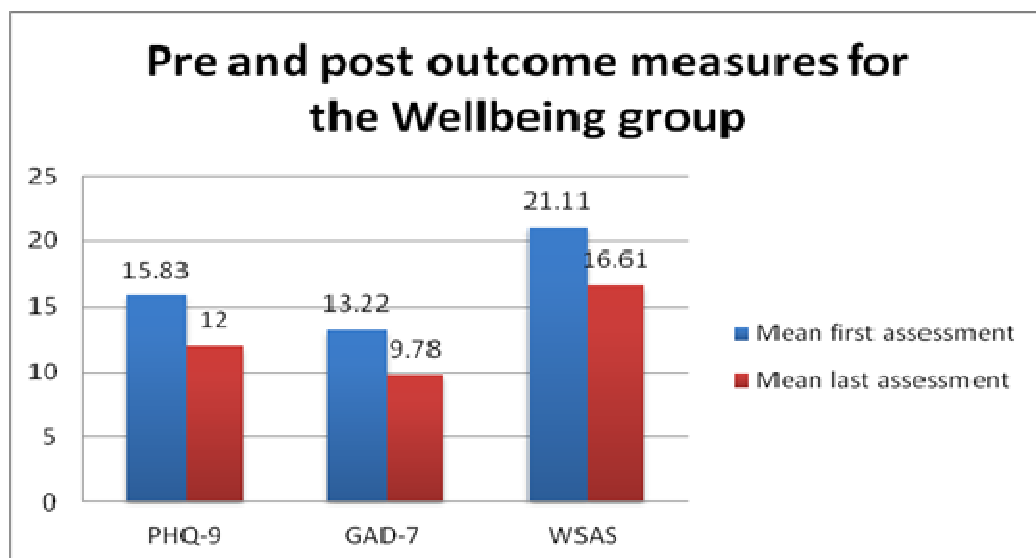
3.2 Clinical Measures for group completers

3.2.1 Overview

The pre and post PHQ-9, GAD-7 and WSAS was collected for all 18 completers. The mean scores of all of these measures showed a statistically significant decrease.

The mean PHQ-9 scores decreased from 15.83 (moderately severe) to 12.00 (moderate). The GAD-7 scores decreased from 13.22 (moderate) to 9.78 (mild). Similarly the WSAS scores decreased from 21.11 to 16.61.

Figure 4 – A graph of the first and last scores for the PHQ-9, GAD-7, and WSAS.



The pre and post EuroQol was collected for all 18 completers and the EuroQol VAS score was gathered for 17 of the 18 completers. A statistically significant change between the mean first EuroQol (0.28) and the mean last EuroQol (0.31) was not observed. The EuroQol VAS score showed a statistically significant increase from 42.47 to 54.12.

Figure 5 – The first, last and difference between the scores for the PHQ-9, GAD-7, WSAS and EuroQol.

| | PHQ-9 (n = 18) | GAD-7 (n = 18) | WSAS (n = 18) | EuroQol (n = 18) | VAS (n=17) |
|-----------------------|-------------------|-------------------|------------------|---------------------|---------------|
| Mean first assessment | 15.83 | 13.22 | 21.11 | 0.28 | 42.47 |
| Mean last assessment | 12.00 | 9.78 | 16.61 | 0.31 | 54.12 |
| Difference | 3.83* | 3.44** | 4.5* | 0.03 | 11.65* |

*Statistically significant difference $p < 0.01$

**Statistically significant difference $p = 0.001$

3.2.2 PHQ-9

The PHQ-9 scores for completers ranged from 7 to 27 at initial assessment and from 1 to 23 at final assessment. The mean PHQ-9 scores decreased from 15.83 (moderately severe) to 12 (moderate) (($t(17) = 3.561$, $p=0.002$), Cohen's $d = 0.57$ (95% CI -0.11, 1.25)). Prior to the intervention, 13 individuals (72.2%) were meeting the clinical caseness cut-off (≥ 10), post intervention this dropped to 9 individuals (50%).

Figure 6 - The pre and post group categorical breakdown on the PHQ-9.

| PHQ-9 score categories | Pre group (n=18) | Post group (n=18) |
|--------------------------------------|------------------|-------------------|
| No Depression (0-4) | 0 (0%) | 2 (11.1%) |
| Mild Depression (5-9) | 5 (27.8%) | 7 (38.9%) |
| Moderate Depression (10-14) | 2 (11.1%) | 2 (11.1%) |
| Moderately Severe Depression (15-19) | 5 (27.8%) | 3 (16.7%) |
| Severe Depression (20+) | 6 (33.3%) | 4 (22.2%) |

Prior to the group nearly two thirds (61.1%, $n = 11$) of completers were scoring in the moderately severe to severe ranges and only 38.9% ($n = 7$) were scoring in the mild to moderate ranges. By the last session this had reversed so that 38.9% of completers ($n = 7$) were scoring in the moderately severe to severe ranges and 61.1% ($n = 11$) were scoring in the mild to moderate range.

On average completers who initially scored above the clinical caseness cut-off (≥ 10) showed a larger decrease in their PHQ-9 scores across the intervention (4.08 points, S.D. = 5.24) compared to those initially scoring below the clinical caseness cut-off (3.2 points, S.D. = 2.38), although this difference was not statistically significant.

3.2.3 GAD-7

The GAD-7 scores for completers ranged from 4 to 20 at initial assessment and from 0 to 20 at final assessment. The mean GAD-7 scores decrease from 13.22 (moderate) to 9.78 (mild) (($t(17) = 3.792$, $p=0.001$), Cohen's $d = 0.56$ (95% CI -0.12, 1.24)). The percentage of cases reaching the cut-off for caseness (≥ 10) fell from 83.33% ($n=15$) to 50% ($n=9$). Prior to the group nearly half of completers (44.4%, n

= 8) were scoring in the severe anxiety range, following the group this figure fell to just over a quarter of completers (27.8%, n = 5).

Completers initially scoring above the cut-off (≥ 10) did not show a noticeable difference in score change (mean = 3.33, S.D. = 1.15) compared to those scoring below the cut-off (mean = 3.47, S.D. = 4.22).

Figure 7 - The pre and post group categorical breakdown on the GAD-7.

| GAD-7 score categories | Pre group (n=18) | Post group (n=18) |
|--------------------------|------------------|-------------------|
| No Anxiety (0-4) | 1 (5.6%) | 5 (27.8%) |
| Mild Anxiety (5-9) | 2 (11.1%) | 4 (22.2%) |
| Moderate Anxiety (10-14) | 7 (38.9%) | 4 (22.2%) |
| Severe Anxiety (15+) | 8 (44.4%) | 5 (27.8%) |

3.2.4 WSAS

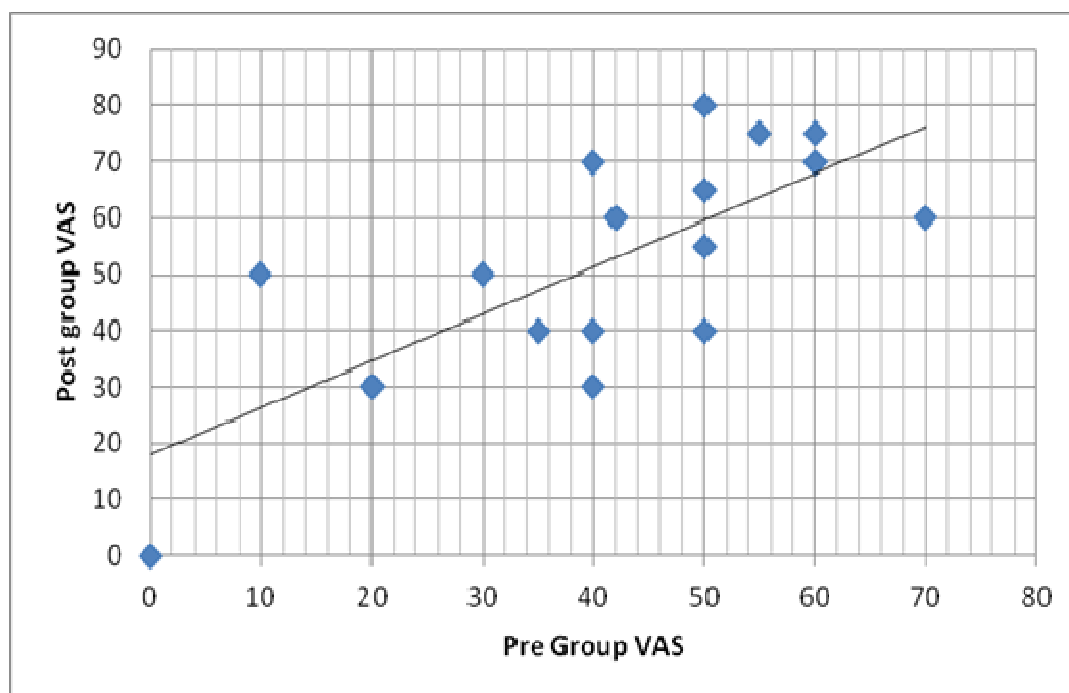
The WSAS scores for completers ranged from 6 to 37 at initial assessment and from 2 to 31 at final assessment. The mean WSAS scores decreased from 21.11 to 16.61 (($t(17) = 2.532$, $p=0.021$), Cohen's $d = 0.46$ (95% CI -0.22, 1.14)).

3.2.5 EuroQol

The mean EuroQol scores did not show a statistically significant change between the mean first EuroQol (0.28) and the mean last EuroQol (0.31) (($t(17) = -.418$, $p=0.681$), Cohen's $d = -0.08$ (95% CI -0.75, 0.59)).

In addition there was pre and post data for 17 of the 18 completers on the VAS. The mean pre treatment VAS was 42.47 (S.D. = 18.79), the mean post treatment VAS was 54.12 (S.D. = 20.93). This change in scores was statistically significant (($t(16) = -3.335$, $p=0.004$), Cohen's $d = -0.58$ (95% CI -1.28, 0.12)).

Figure 8 – A graph displaying the pre and post group VAS scores.



3.3 Qualitative feedback

To help summarise the anonymous qualitative feedback, the forms were collated across the groups and into overarching themes by the primary researcher, these themes were then reviewed with a clinical supervisor. Five themes were found for the aspects that completers found helpful and three were found relating to areas that the group could be improved.

3.3.1 Feedback about helpful aspects of the group

Five key themes were extracted relating to the aspects of the group that the attendees found helpful. One theme related to improving their understanding about depression. This included learning about the symptoms of depression, factors which impact on mood (for example social isolation) and thinking about practical strategies to manage low mood. A second theme focused on group support from others experiencing similar problems. Completers reported enjoying being with others with similar problems, being able to share their problems but also to listen to others problems and coping strategies. A third positive theme was found around the inclusion of Mindfulness components and relaxation exercises. A fourth theme suggested that the

completers found the group atmosphere helpful. For example completers talked about the “warm manner of staff” and “non-judgemental” nature of the group. The final theme was around the psychoeducation components and discussion of practical strategies. Completers reported finding the following psychoeducation components helpful: sleep, pain and diet and nutrition.

3.3.2 Feedback about potential areas of improvement

Three key themes were extracted relating to potential areas of improvement. One theme focused on practical suggestions relating to the group structure. For example completers asked for: longer sessions, more sessions, changes to the physical environment, having more group participants, incorporating music into the relaxation practice and having more one-to-one time. A second theme was found relating to increasing the amount of time spent on topics and exercises already in the group program. In particular there were requests for more mindfulness and relaxation exercises. The final theme reflected the wish for including topics not currently in the group program. For example completers asked for: specific diet and food advice, side effects of medication and one completer requested a space to focus on diabetes.

4. Discussion

The aim of this project was to review the effectiveness of a Wellbeing group developed for adults with LTC and co-morbid anxiety and/or depression. The results showed that completers of the Wellbeing group demonstrated statistically significant decreases in clinical scores on measures of depression (PHQ-9), anxiety (GAD-7) and work and social functioning (WSAS). A medium effect size was observed for all of the above measures (using Cohen's 1988 cut off points). Although no difference was observed on a measure of health status (Euroqol) there was an observed increase in subjective health state as measured by the Euroqol VAS. These results are in line with previous findings that psychological interventions can have a positive impact on anxiety and depression in patients with co-morbid LTCs but that it is less clear whether they impact on physical wellbeing. In addition the group received positive qualitative feedback from attendees suggesting that it may be an acceptable intervention.

4.1 Clinical outcomes

4.1.1 Depressive severity

As described earlier the Wellbeing group is a step 2 intervention for individuals with mild to moderate depression and or anxiety. Although this group was aimed at mild to moderately depressed individuals the mean pre-treatment PHQ-9 score for the Wellbeing participants fell within the moderately severe range (16.15), with nearly two thirds of completers (65%) being classified as moderately severe or severe at the start of the intervention. This highlights that many attendees may be presenting with more severe and potentially more complex depressive episodes than initially thought. As NICE guidance recommends a broader range of step 3 and 4 interventions for individuals presenting with moderate or severe depression one might expect to observe poorer outcomes for this group of individuals when attending a step 2 intervention compared to participants with milder depression. Interestingly this effect was not observed, in contrast individuals in the moderately severe and severe PHQ-9 categories showed slightly larger improvements on the PHQ-9 versus those

scoring in the mild and moderate categories (although this did not reach statistical significance). This suggests that the Wellbeing group may be beneficial at decreasing depression scores for adults reporting mild through to severe PHQ-9 scores.

In this project only the PHQ-9 was used to rate severity of depression. Although the PHQ-9 demonstrates good sensitivity and specificity for diagnosing depression it is a self-report measure and as a result is susceptible to a range of self-report biases, which makes it more difficult to determine the reliability of the severity ratings. To test whether the Wellbeing group is truly beneficial for moderate to severe depressive presentations it would be useful to measure depression severity using a range of self-report and clinician rated tools. This was not within the remit of this project however it could be explored in future groups to help determine for whom the intervention is most beneficial.

4.1.2 Ratings of anxiety

As the Wellbeing group was initially developed for individuals with LTC and depression its content primarily focuses on understanding and treating low mood rather than anxiety. Currently there are no NICE guidelines on treating anxiety for individuals with LTCs. As depression and anxiety are frequently co-occurring it is important to understand how best to support individuals presenting with anxiety and whether this format of intervention works as well for symptoms of anxiety as it does for symptoms of depression. This analysis demonstrated similar statistically significant decreases on the PHQ-9 and GAD-7 and similar medium effect sizes, suggesting that the Wellbeing group is effective at decreasing self-reported symptoms of both depression and anxiety.

As the program does not contain specific anxiety information and strategies it would be interesting to understand more about which components of the treatment are helpful for individuals presenting predominantly with anxiety versus depression. There are a number of components that could hypothetically be affecting anxiety scores either as standalone topics or in combination with other group factors. For example learning basic CBT skills and relaxation strategies in the context of a

supportive group may be more useful than either component alone. As this is not a manualised intervention understanding the key effective components could enable the group to be modified slightly depending on whether group members are presenting predominantly with depression or anxiety.

4.1.3 Health Related Quality of Life

In the analysis no change was seen on health status, as measured by the Euroqol, although a change was found for subjective perceived health, as measured by the Euroqol VAS. There appears to be a strong relationship between depression and a number of behaviours which can have a negative impact on an individuals health and wellbeing for example decreased medication compliance, poorer self care and less physical activity (Das-Munchi et al., 2007; DiMatteo et al., 2000; Gehi et al., 2005; Theofilou, 2013; Vamos et al., 2009; Whooley et al., 2008). Therefore one might expect that an intervention aimed at reducing depressive symptoms may also lead to some improvements in physical health as a result of changing unhelpful behavioural patterns. However, the evidence for this has been mixed (e.g. Rees et al., 2004; Howard et al., 2010). In this analysis it is unclear whether this lack of change reflects a true lack of change in health related quality of life or whether this is due to problems with the design of the group analysis. One potential problem with the design is the lack of follow up assessment. The Wellbeing group consists of 6 weekly treatment sessions, this is unlikely to be a long enough time period to see changes in health related quality of life secondary to mood improvements. Collecting follow-up data could determine whether the Wellbeing group leads to longer term health related improvements. Another possibility is that the EuroQol may not be sensitive to detecting the effects of this intervention. The Euroqol consists of 5 questions assessing different areas of functioning, some of which are potentially static and unlikely to change following a psychosocial intervention (for example level of mobility). The focus of this intervention is not predominantly on changing health-related behaviours (e.g. smoking cessation) but rather on increasing wellbeing. The Euroqol VAS or specific wellbeing measures may be more helpful in assessing wellbeing outcomes because they enable individuals to take into consideration their overall subjective perceived health, as opposed to specific pre-determined areas.

4.2 Qualitative participant feedback

In addition to measuring quantitative clinical outcomes this project aimed to review the service user feedback to aid the development of the group and determine the acceptability of the group. Despite the anonymity of the service user feedback, it was collected by the course facilitators and it is possible that the service users may have consciously or unconsciously responded more positively as a result. To help minimise this in future groups the feedback could be collected via staff not associated with the group.

4.2.1 The content of the group

The qualitative feedback suggested that the completers found a number of aspects of the group content helpful. These were: understanding about what impacts our mood and how to manage low mood, the mindfulness and relaxation information and exercises, psychoeducation and discussion of practical strategies focused on diet and exercise, sleep and pain. When asked how to improve the group, none of the feedback forms suggested any of the current topics to be unhelpful or necessary to exclude. Completers expressed a wish to have more time devoted to topics and exercises which are already in the group program (e.g. mindfulness and relaxation) and some completers asked for specific topics to be added (including the side effects of medication and diabetes specific information).

4.2.2 Areas for potential improvement

As noted in the above section some completers requested specific topics to be added to the program. With any short term intervention it is necessary to keep in mind its aims and related to this the most useful components to include. Due to the multi-disorder nature of the group it is not within the remit of this group to focus on disorder specific information. This may be something that could be incorporated through offering leaflets on specific disorders or through directing individuals to specialist medical services for further information. Incorporating other topics would result in either less time dedicated to current topics or the group being extended in length. When thinking about whether to increase the length of the group it is

important to consider the cost-benefit ratio of this, is the benefit of including another session enough to justify the cost of the clinicians time. This will invariably depend on the available resources of the service and the group facilitator.

Other areas for potential improvement focused on practical aspects such as the room which the group was set in, the number of sessions, the number of group participants, incorporating music into the relaxation practice and having more one-to-one time. Some of these suggestions could be incorporated with minimal cost or time. As the pilot groups were constantly recording service user feedback and integrating it into the program structure the feedback varied slightly between the groups. For example it was only the first pilot group who requested the group room to change, following this feedback the group was run in a different room. This demonstrates that service user feedback was genuinely being valued and incorporated where possible.

4.2.3 Acceptability of the group format

Completers reported finding the group support from others experiencing similar problems and the group atmosphere helpful. In addition no-one reported wishing to have the intervention as a one-to-one format, and only one person reported wanting more one-to-one time. This feedback suggests that the group format may be an acceptable way of running the intervention.

4.3 The structure of the Wellbeing group and NICE guidance

The NICE guidance regarding the treatment of depression in the context of LTC advocates low intensity psychosocial and psychological interventions for individuals with persistent sub threshold depressive symptoms or mild to moderate depression. The Wellbeing group appears to be a potentially beneficial low intensity approach which has shown a positive impact on self-ratings of depression, anxiety and work and social adjustment. Additionally it is in line with the majority of the NICE suggestions regarding the layout of low intensity groups. For example the qualitative feedback shows that the group “*focuses on sharing experiences and feelings associated with having a chronic physical health problem*”, and is supported by

practitioners who “*have knowledge of the patients' chronic physical health problem and its relationship to depression*” (NICE, 2009, p21).

There is however one aspect of the NICE guidance which the Wellbeing group does not follow, NICE advocates that the low intensity group interventions for adults with depression and LTC should be “*delivered to groups... with a common chronic physical health problem*” (NICE, 2009, p21). The Wellbeing group is a multi-disorder group; however it does differentiate between LTCs associated with an observable physical cause (e.g. COPD and diabetes) and medically unexplained symptoms (e.g. fibromyalgia or chronic fatigue syndrome). When the Wellbeing group was initially planned it was designed to be specific for individuals with cardiac problems, however this group never ran due to the service receiving insufficient referrals. As a result the group inclusion criteria was expanded to cover a broad range of LTCs. It is therefore likely that in an IAPT setting a disorder specific group could lead to individuals with rarer LTCs experiencing either long waiting times or being unable to attend a group due to the lack of participants. A multi-disorder LTC group may be more advantageous in a busy primary care service such as IAPT for a number of practical reasons. A multi-disorder group may be more time and cost efficient as group participants are likely to be identified quicker, leading to potentially shorter waiting times. Furthermore a multi-disorder group may be more inclusive as it enables all individuals with a LTC and anxiety and or depression the equal opportunity to attend the group. One could argue that potentially a key component of the intervention is the ability to share similar experiences which may differ across different diagnoses. However, the qualitative service user feedback highlighted that participants did find it helpful to share experiences with others experiencing similar problems, despite the fact that groups included a range of presenting physical conditions.

4.4 Limitations of the current project

Readers must be cautious when looking at the statistical analysis completed for this study as it only included 20 participants who had completed the Wellbeing group. It is difficult to determine whether this sample of 20 completers accurately portrays the population being studied and as a result it would be useful to continue to monitor the

outcomes as future groups are run. However, it is encouraging to have observed statistically significant changes and medium effect sizes for three of the clinical outcome measures despite the small number of participants.

Due to the limited sample size this project has not been able to explore for whom the Wellbeing group is most beneficial. As discussed earlier two potentially useful areas to further explore would be whether the group has differing outcomes for individuals entering with more severe levels of depression and those entering reporting predominately anxiety problems. Understanding the individual variables which influence intervention outcomes can help to maximise the appropriateness of referrals and potentially decrease the number of individuals not engaging with the group.

In addition currently the key active components of the Wellbeing group are unclear and have not been investigated due to the small number of groups run and attendees. The main elements of the Wellbeing group are: psychoeducation, CBT, relaxation training, mindfulness strategies, peer support and behavioural activation. Understanding which aspects, and in which combination, lead to the most beneficial outcomes will be useful to optimise the impact of the group. Furthermore since the Wellbeing group was created a Mindfulness Based Stress Reduction (MBSR) group has also been set up in Southwark IAPT for individuals with LTCs. It would be useful to compare these groups firstly to determine whether they result in equivalent outcomes but additionally this could help us to understand the components leading to reductions in clinical scores which are shared versus different across the groups.

The Wellbeing group demonstrated a very low attrition rate (5% $n = 1$) across the four groups however a third of invitees ($n = 10$) failed to engage with the intervention. In this project failure to engage was classified as declining the group, not responding to the invitation or withdrawing from the group prior to the first session. It would be useful to investigate the reasons that individuals did not engage to determine whether this reflects individual factors (e.g. not wishing to attend a group), practical factors (e.g. timing or location of the group) or Wellbeing group specific factors (e.g. its layout and content). Understanding this may help to

maximise the inclusiveness of the group and may ensure that individuals are receiving the most appropriate intervention.

As discussed above the Wellbeing group is a multi-disorder group. Although disorder specific groups have been advocated by NICE the Wellbeing multi-disorder group has shown positive changes in a number of clinical outcomes. However it would be useful to clarify whether disorder specific or multi-disorder groups lead to differing clinical outcomes. It is also possible that disorder specific groups may work better for certain conditions and non-specific for other. To determine the most effective way to implement the LTC groups, ideally you would want to complete a controlled comparison study comparing disorder specific and non-specific groups utilising the same protocol and assessment measures. This could be problematic in an IAPT service due to the known practical difficulties of establishing disorder specific groups. Perhaps therefore the Wellbeing group program could be shared with services more likely able to run disorder specific group (e.g. psychology teams situated in physical health services). This could enable the comparisons of outcomes following disorder specific versus non-specific groups.

4.5 Dissemination of the evaluation

Following the statistical analysis the research findings were disseminated to the Southwark IAPT service through a presentation at a team away day. This presentation summarised the outcome measures and the service user feedback. In addition a finalised version of this evaluation will be sent to Dr Sharon Chambers (group co-creator) to enable it to be shared with professionals interested in learning more about the Wellbeing group.

4.6 Conclusion

This evaluation found that the Wellbeing group was an effective intervention for decreasing self-report levels of depression (PHQ-9), anxiety (GAD-7) and work and social functioning (WSAS) for the 20 completers. Changes were not observed on a measure of health status (EuroQol) however there was an observed increase in subjective health state as measured by the EuroQol VAS. These findings are in line

with previous research looking at psychological interventions for individuals with LTC and co-morbid anxiety and/or depression. In addition the service user feedback and low attrition rates support the idea that this may be an acceptable intervention. This project also recognised a number of limitations in terms of its methodological design. Furthermore a number of potential future areas for research are highlighted which could enhance our understanding of the mediators of change and therefore how to maximise the effectiveness of the group. In summary the Wellbeing group appears to be a useful low intensity intervention for service users with LTCs and mild to moderate anxiety and/or depression, however there remains scope for further improvement in the research and validation of the Wellbeing group.

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6. Appendices

6.1 Appendix 1 – Referral flyer for the Wellbeing group

Southwark Psychological Therapies Service:
***Wellbeing group for people with Long Term Health Conditions
and mild to moderate anxiety or depression***

FOR SPTS TEAM LEADERS (when assessing/screening when considering for **LTC group**)

The group provides opportunities for people with long term conditions to learn how to manage low mood and stress, worsened due to their medical condition. They will gain psycho-education, peer support from other group participants, and some self help guidance from facilitators with general practice and psychological experience

Most helpful for:

- Medically diagnosed Long Term Condition(LTCs). e.g. CHD, COPD, Asthma, hypertension, diabetes, pain directly associated with organic medical condition, including OA, Rh.Arthritis, actual back injury, actual degenerative condition of spine, but not for chronic pain, fibromyalgia, etc)
- Current mild/sub-threshold to moderate symptoms of depression and/or anxiety
- Mobile to be able to physically able to attend sessions
- English speaking / reading levels enough to participate

Exclusion:

- Medically unexplained symptoms, includes chronic pain with unknown origin/non-organic basis, Fibromyalgia, IBS.
- People for whom the *main problem* is OCD, panic disorder or PTSD, severe borderline PD or severe treatment resistant depression or anxiety
- Severe Mental Illness e.g. schizophrenia, bi-polar depression etc
- Current suicidal intent/DSH, or risk to others
- Current illicit drug use or severe alcohol use
- Severe LTC making attendance difficult

In order to benefit from this group, participants need to:

- Commit to attend weekly sessions on Monday afternoons at Guys Hospital York Clinic.
- Be able and willing to participate in a group, share, listen and interact with other group members

FEEDBACK SHEET

In order to help us to develop this group to your needs and for future groups, we would really value your thoughts about how you found today's session.

Please write one or two sentences at most on the following sections on this sheet:

1/ What I found most helpful from today's session was.....

What I would like more of is.....

2/ What could be improved upon is.....

(and if you have any thoughts/ ideas on this please write down here also)

6.3 Appendix 3 – List of presenting physical health conditions for included participants

| |
|-------------------------------|
| • Multiple Sclerosis |
| • Diabetes |
| • Asthma |
| • Spinal injury / back pain |
| • Chest pain (NOS) |
| • Cardiac (heart failure) |
| • Diabetes, cancer |
| • Fibromyalgia |
| • Arthritis |
| • Emphysema |
| • Chronic pain (knee surgery) |